PLANNING BOARD
PORTSMOUTH, NEW HAMPSHIRE

EILEEN DONDERO FOLEY COUNCIL CHAMBERS
CITY HALL, MUNICIPAL COMPLEX, 1 JUNKINS AVENUE

7:00 PM Public Hearings begin **July 18, 2024**

AGENDA

REGULAR MEETING 7:00pm

I. APPROVAL OF MINUTES

A. Approval of the June 20, 2024 meeting minutes.

II. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

A. REQUEST TO POSTPONE The request of **Perkins Kwoka Joint Revocable Trust (Owner),** for property located at **224 Broad Street, Unit 3** is requesting a Wetland Conditional Use Permit from Section 10.1017.50 for the replacement and expansion of an existing 192 s.f. sunroom and the demolition of a 286 s.f. rear deck, with new construction proposed for an addition of 384 s.f. to the existing sunroom, a new 367.5 s.f. rear deck and regrading of a portion of the site for the installation of a retaining wall and underdrain for stormwater control. The applicant is proposing to remove 491 s.f. of existing pavers and asphalt to be replaced with 401 s.f. of new pavers. This proposal includes the removal of the existing lawn to be replaced with a micro-clover seed mix, a planting plan, and a stone drip edge. Said property is located on Assessor Map 131 Lot 13-3 and lies within the General Residence A (GRA) District. **REQUEST TO POSTPONE** (LU-23-179)

B. The request of **Lonza Biologics (Owner),** for property located at **5 Technology Way (*Formerly 70 Corporate Drive*)** requesting Amended Site Plan approval for the addition of Phase Photovoltaic Cell (PV) Solar canopies over the previously approved temporary surface parking lot with associated utility infrastructure improvements. Said property is located on Assessor Map 305 Lot 6 and lies within the Airport Business (ABC) District. (LU-23-108)

C. The request of **The City of Portsmouth (Owner),** for property located at **50 Andrew Jarvis Drive** requesting a Wetland Conditional Use Permit from Section 10.1017.50 of the Ordinance for the conversion of an existing practice field into a baseball and softball practice field which includes adding an 800 s.f. batting cage, a 40' wide backstop with posts driven into the ground, and the removal of approximately 800 s.f. of existing grass for replacement with an infield mix of clay, sand and silt. All of this work will occur within the 100' wetland buffer. Said property is located on Assessor Map 229 Lot 3 and lies within the Municipal (M) District. (LU-24-50)

D. The request of **The City of Portsmouth (Owner),** for property located at **0 Maplewood Avenue** requesting an after the fact Wetland Conditional Use Permit from Section 10.1017.50 of the Ordinance due to the emergency authorization issued by NHDES on May 16, 2024 for repair of the stone wall alongside the North Cemetery. This application is for the restoration and repair of the wall in-kind which includes installation of new stone, installing non-woven geotextile along the eroded bank, importing structural backfill, and loam and seeding the disturbed areas once finished. Said property is located on Assessor Map 124 Lot 2 and lies within the Municipal (M) District. (LU-24-102)

E. The request of **Rosania RR & KL Revocable Trust (Owner),** for property located at **32 Boss Avenue** requesting a Conditional Use Permit in accordance with Section 10.440, Use 19.22 for a Home Occupation 2. Said property is located on Assessor Map 153 Lot 5 and lies within the Single Residence B (SRB) District. (LU-24-117)

F. The request of **Mark E.** and **Janet Greenwood (Owners),** for property located at **480 Dennett Street** requesting a Conditional Use Permit from Section 10.814 for a Detached Accessory Dwelling Unit (DADU) for the demolition of the existing garage and construction of a new DADU Said property is located on Assessor Map 160 Lot 26 and lies within the General Residence A (GRA) District. (LU-24-120)

G. The request of **Portsmouth West End Development LLC (Owner**), for property located at **125 Brewery Lane** requesting a Conditional Use Permit in accordance with Section 10.440, Use 19.50 for an outdoor dining and drinking area as an accessory use. Said property is located on Assessor Map 154 Lot 2 and lies within the Character District 4-W (CD-4W) District. (LU-24-108)

III. PRELIMINARY CONCEPTUAL CONSULTATION

A. The request of **Frances E. Mouflouze Revocable Trust of 2015 (Owner),** for property located at **550 Sagamore Avenue** requesting preliminary Conceptual Consultation for a subdivision of one lot into three conforming lots with associated site improvements. Said property is located on Assessor Map 222 Lot 11 and lies within the Single Residence B (SRB) District. (LUPD-24-5)

B. 361 Hanover Steam Factory, LLC (Owner), for property located at **361 Hanover Street**, requesting Preliminary Conceptual Consultation for the construction of three residential buildings along Hanover Street and add a fourth story with a penthouse to the existing 361 Hanover Street (Portsmouth Steam Factory) building for a total of 48 dwelling units including 3 workforce housing units and 69 parking spaces and associated community space. Said property is located on Assessor Map 138 Lot 63 and lies within the Character District 5 (CD5) Downtown Overlay and North End Overlay Districts. (LUPD-24-3)

IV. OTHER BUSINESS

A. Chairman updates and discussion items

B. Planning Board Rules and Procedures

C. Board discussion of Regulatory Amendments, Master Plan Scope & other matters

V. ADJOURNMENT

**Members of the public also have the option to join this meeting over Zoom, a unique meeting ID and password will be provided once you register. To register, click on the link below or copy and paste this into your web browser:*

https://us06web.zoom.us/webinar/register/WN_AXjPB9HpRnaVn9EtKcrc2w

City of Portsmouth
Planning Department
1 Junkins Ave, 3rd Floor
Portsmouth, NH
(603)610-7216

Memorandum

To: Planning Board

From: Peter Stith, AICP
Planning Manager

Date: July 18, 2024

Re: Recommendations for the July 18, 2024 Planning Board Meeting

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I. APPROVAL OF MINUTES

A. Approval of the June 20, 2024 meeting minutes.

Planning Department Recommendation

1) Board members should determine if the draft minutes include all relevant details for the decision-making process that occurred at the June 20, 2024 meeting and vote to approve meeting minutes with edits if needed.

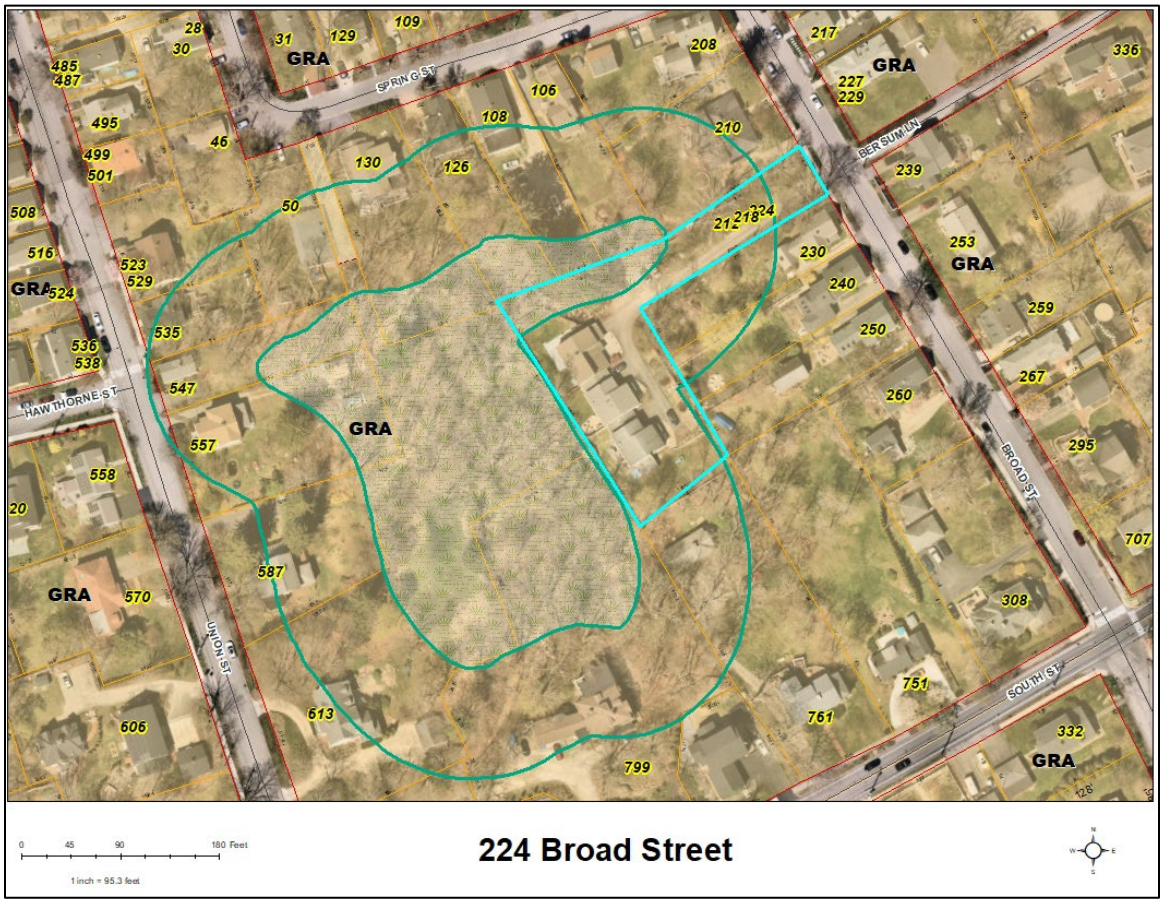
II. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

A. The request of **Perkins Kwoka Joint Revocable Trust (Owner)**, for property located at **224 Broad Street, Unit 3** is requesting a Wetland Conditional Use Permit from Section 10.1017.50 for the replacement and expansion of an existing 192 s.f. sunroom and the demolition of a 286 s.f. rear deck, with new construction proposed for an addition of 384 s.f. to the existing sunroom, a new 367.5 s.f. rear deck and regrading of a portion of the site for the installation of a retaining wall and underdrain for stormwater control. The applicant is proposing to remove 491 s.f. of existing pavers and asphalt to be replaced with 401 s.f. of new pavers. This proposal includes the removal of the existing lawn to be replaced with a micro-clover seed mix, a planting plan, and a stone drip edge. Said property is located on Assessor Map 131Lot 13-3 and lies within the General Residence A (GRA) District. (LU-23-179)

Background

This application is requesting a Wetland Conditional Use Permit for the replacement and expansion of an existing 192 s.f. sunroom and the demolition of a 286 s.f. rear deck, with new construction proposed for an addition of 384 s.f. to the existing sunroom, a new 367.5 s.f. rear deck and regrading of a portion of the site for the installation of a retaining wall and underdrain for stormwater control. Additionally, the applicant is proposing to remove 491 s.f. of existing pavers and asphalt to be replaced with 401 s.f. of new pavers. This proposal includes the removal of the existing lawn to be replaced with a micro-clover seed mix, an extensive planting plan, and a stone drip edge surrounding the new sunroom and deck.



Staff Analysis – Wetland CUP

According to Article 10 Section 10.1017.50 the applicant must satisfy the following conditions for approval of this utility project.

1. The land is reasonably suited to the use activity or alteration.

The existing site has a steep slope which has been directing stormwater into and around the existing home, instead of towards the adjacent wetland. The proposed stormwater controls will involve some regrading of the lawn and the redirection of stormwater away from the home and through an underdrain to outlet underneath the expanded deck. This proposed deck will have ¾" spaced decking and will have crushed stone underneath for infiltration.

2. There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration.

The majority of this property is within the 100 ft. buffer. The existing home is within the buffer and experiencing impacts of stormwater and ponding on the property. The applicant is proposing to address these issues with new stormwater controls and the addition of plantings, while working to reduce the impervious surface where possible.

3. There will be no adverse impact on the wetland functional values of the site

or surrounding properties.
The applicant is proposing to redirect stormwater directly through an underdrain and into a crushed stone area to slow infiltration. This should improve the flooding conditions for the home while directing the flow closer to the wetland with an option for infiltration into the soil.

4. Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.
The applicant is proposing to maintain all existing trees and vegetation. In addition, the applicant will be improving the vegetation on site by planting a native micro-clover lawn in addition to planting beds and multiple trees and shrubs.

5. The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this section.

While the applicant is proposing an expansion of the home within the buffer, the expansion is occurring in the direction opposite of the wetland and will be compensated with a reduction in existing impervious. There are plans for overall improvements to the buffer including landscaping and reseeding the lawn with a micro-clover seed mix.

6. Any area within the vegetated buffer strip will be returned to a natural state to the extent feasible.

The applicant is proposing to stay completely outside of the 25' vegetated buffer.

Project Review, Decisions, and Recommendations
The applicant was before the Conservation Commission. See below for details.

Conservation Commission
The applicant was before the Conservation Commission at its regularly scheduled meeting of Wednesday, April 10, 2024 and the Commission voted unanimously to recommend approval as presented.

Planning Department Recommendation
Wetland Conditional Use Permit

1) Vote to find that the Conditional Use Permit Application meets the requirements set forth in Section 10.1017.50 of the Ordinance and adopt the findings of fact as presented.

(Alt.) Vote to find that the Conditional Use Permit Application meets the requirements

set forth in Section 10.1017.50 of the Ordinance and adopt the findings of fact as amended.

2.) Vote to grant the Conditional Use Permit as presented.

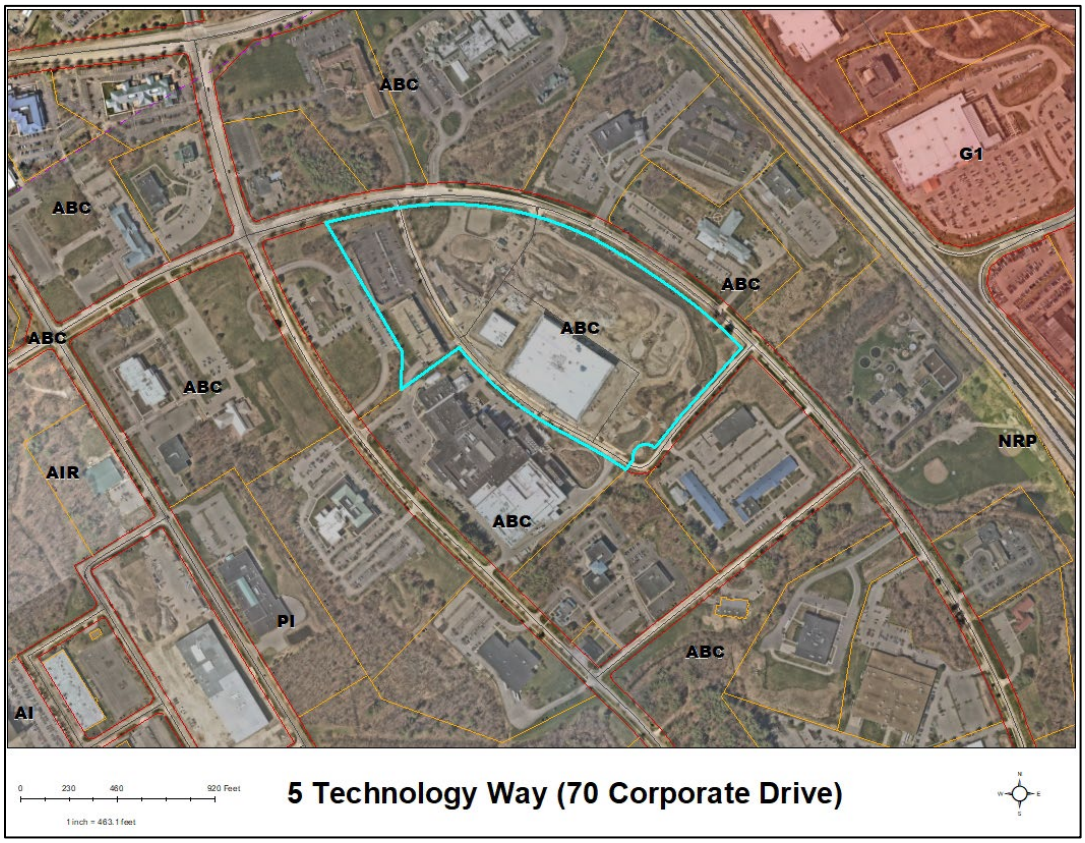
III. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

B. The request of (Owner), for property located at **5 Technology Way (*Formerly 70 Corporate Drive*)** requesting Amended Site Plan approval for the addition of Phase Photovoltaic Cell (PV) Solar canopies over the previously approved temporary surface parking lot with associated utility infrastructure improvements. Said property is located on Assessor Map 305 Lot 6 and lies within the Airport Business (ABC) District. (LU-23-108)

Background

This application is seeking Amended Site Plan approval to add Solar canopies over the proposed surface parking lot area. The addition of the solar canopies will require electrical modifications and will result in no impact to the drainage design for the project.



Project Review, Discussion, and Recommendations

The project was before the Technical Advisory Committee in June. See below for

details.

Technical Advisory Committee
The applicant was before TAC for at their regularly scheduled meeting of Tuesday, June 4, 2024 meeting. TAC voted to recommend that the Planning Board recommend approval to the Pease Development Authority as presented.

The amendments to RSA 676:3 with regards to adopting findings of fact for a project apply to local planning boards making decisions based on the municipality's regulations. Pease falls exclusively under RSA 12-G and the Pease Land Use Controls, therefore the requirement to vote on and adopt findings of fact do not apply for this application.

Planning Department Recommendation

Site Plan Approval

1) *Vote to recommend Amended Site Plan Approval to the PDA Board.*

III. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

C. The request of **The City of Portsmouth (Owner),** for property located at **50 Andrew Jarvis Drive** requesting a Wetland Conditional Use Permit from Section 10.1017.50 of the Ordinance for the conversion of an existing practice field into a baseball and softball practice field which includes adding an 800 s.f. batting cage, a 40' wide backstop with posts driven into the ground, and the removal of approximately 800 s.f. of existing grass for replacement with an infield mix of clay, sand and silt. All of this work will occur within the 100' wetland buffer. Said property is located on Assessor Map 229 Lot 3 and lies within the Municipal (M) District. (LU-24-50)

Project Background

This application is for the conversion of an existing practice field into a more formalized baseball and softball practice field at the high school. The proposal includes the addition of an 800 s.f. batting cage, and a 40' wide backstop with posts driven into the ground, and the removal of approximately 800 s.f. of existing grass for replacement with an infield mix of clay, sand and silt. All of this work will occur within the 100' wetland buffer, with additional grass removal and infield mix placement outside the 100' buffer.

Staff Analysis – Wetland CUP

According to Article 10 Section 10.1017.50 the applicant must satisfy the following conditions for approval of this utility project.

1. The land is reasonably suited to the use activity or alteration.
This area is already heavily used as a recreation area for high school students and other recreation leagues. The addition of baseball/softball equipment will allow for more teams to utilize the space.

2. There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration.
While there is an alternative location in this area that would create minimal disturbance and be outside the buffer, it would create a safety hazard due to its proximity to buildings and parking areas. The chosen location within the buffer is already used as a recreational field and it does not receive any harmful maintenance such as fertilizer or chemical use, only occasional mowing. The conversion to a baseball/softball field will not change how the buffer has been used historically.

3. There will be no adverse impact on the wetland functional values of the site or surrounding properties.
The infield mix proposed for the new field will be a permeable mix that should not have a noticeable impact on infiltration within this buffer area. The adjacent

wetland is well forested and should not see an impact from this field conversion.

4. Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.
The only vegetation proposed to be removed is a portion of existing grass lawn. This will be replaced with a permeable sand/silt/clay infield mix.

5. The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this section.
The proposal minimizes impacts to the buffer by proposing a permeable infield mix and minimal permanent equipment. On-site alternatives would require greater disturbance to areas that are not already used as recreational fields.

6. Any area within the vegetated buffer strip will be returned to a natural state to the extent feasible.
No work is proposed within the 25' vegetated buffer.

Project Review, Decisions, and Recommendations
The applicant was before the Conservation Commission. See below for details.

Conservation Commission
The applicant was before the Commission at its regularly scheduled meeting of Wednesday, June 12, 2024 and the Commission voted unanimously to recommend approval with the following conditions:

1. *The updated Planning Board submission shall include the new batting cage location, the location of the new no-mow area, and the locations for wetland boundary placards.*

2. *In accordance with Section 10.1018.40 of the Zoning Ordinance, applicant shall permanently install wetland boundary markers, which may be purchased through the City of Portsmouth Planning & Sustainability Department. Markers are to be placed along the 25' vegetative buffer at 50-foot intervals and must be installed prior to the start of any construction.*

The Conservation Commission recommended conditions have been satisfied or added to the staff recommendation.

Planning Department Recommendation
Wetland Conditional Use Permit

1) Vote to find that the Conditional Use Permit Application meets the requirements set forth in Section 10.1017.50 of the Ordinance and adopt the findings of fact as presented.

(Alt.) Vote to find that the Conditional Use Permit Application meets the requirements set forth in Section 10.1017.50 of the Ordinance and adopt the findings of fact as amended.

2.) Vote to grant the Conditional Use Permit with the following conditions:

> *2.1) In accordance with Section 10.1018.40 of the Zoning Ordinance, applicant shall install permanent wetland boundary markers where applicable. In addition to the wetland boundary markers, an educational sign describing the project shall be installed near the restoration area and fencing should be utilized to keep disturbances such as dogs and geese from the area.*

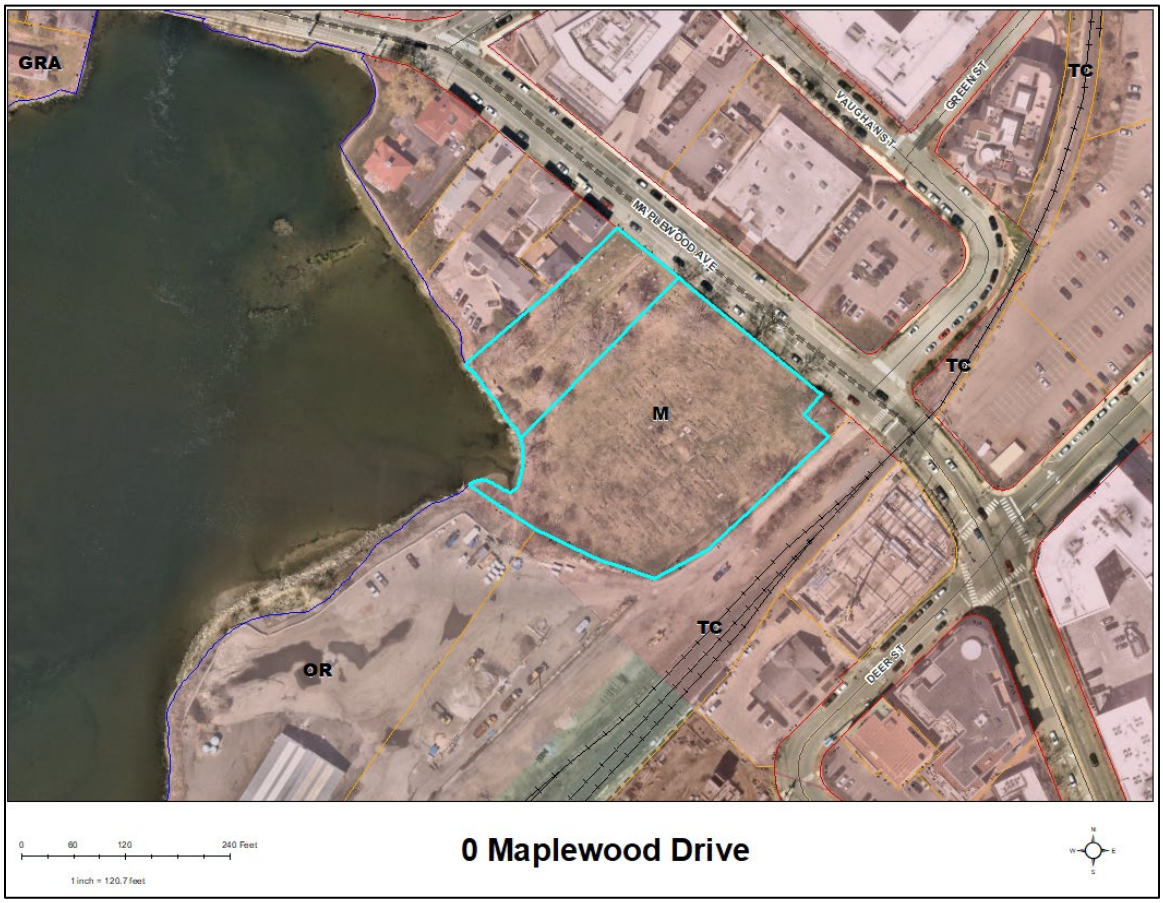
III. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

D. The request of **The City of Portsmouth (Owner),** for property located at **0 Maplewood Avenue** requesting an after the fact Wetland Conditional Use Permit from Section 10.1017.50 of the Ordinance due to the emergency authorization issued by NHDES on May 16, 2024 for repair of the stone wall alongside the North Cemetery. This application is for the restoration and repair of the wall in-kind which includes installation of new stone, installing non-woven geotextile along the eroded bank, importing structural backfill, and loam and seeding the disturbed areas once finished. Said property is located on Assessor Map 124 Lot 2 and lies within the Municipal (M) District. (LU-24-102)

Project Background

The is an after the fact wetland conditional use permit due to the emergency authorization for this work. The stone wall alongside the North Cemetery is in danger of collapse due to significant erosion along the bank and this application is for the restoration and repair of the wall in-kind which includes installation of new stone, installing non-woven geotextile along the eroded bank, importing structural backfill, and loam and seeding the disturbed areas once finished. Recent inspections of this site concluded that any future storm events or heavy rains could cause significant damage and irreversible harm to the stability of this wall and the contents behind it. Due to this, the City of Portsmouth Department of Public Works has obtained an emergency authorization to perform this work from NHDES and is now seeking a wetland conditional use permit.



Staff Analysis – Wetland CUP

According to Article 10 Section 10.1017.50 the applicant must satisfy the following conditions for approval of this utility project.

1. The land is reasonably suited to the use activity or alteration.
This work is an in-kind repair job. The damaged wall is structurally integral to keeping the cemetery border and fill contained.

2. There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration.
There is no alternative location to rebuild this wall in. The safety of the tomb and burials behind the wall is reliant on the structure of this wall and it must be fortified in order to prevent further erosion, or worse, collapse.

3. There will be no adverse impact on the wetland functional values of the site or surrounding properties.
The applicant used professional services to access the area and wall from the adjacent property, so as not to disturb the hallowed ground. This may have impacts on the pathway of any necessary construction vehicles. The applicant shall restore any disturbed soils with native wetland buffer conservation seed mix and monitor for establishment.

4. Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.
The natural vegetated state was disturbed in order to get construction equipment onto the site. This area should be stabilized with erosion controls, along with the wall, and should be reseeded at the end of construction with a native wetland buffer conservation seed mix.

5. The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this section.
The alternatives to not repairing this wall would be allowing it, and the fill, and historic infrastructure to erode and/or slide into the North Mill Pond. The repair of this wall was an emergency repair.

6. Any area within the vegetated buffer strip will be returned to a natural state to the extent feasible.
All areas disturbed within the 25' vegetated buffer shall be reseeded at the end of construction with a native wetland buffer conservation seed mix.

Project Review, Decisions, and Recommendations
The applicant was before the Conservation Commission. See below for details.

Conservation Commission
The applicant was before the Conservation Commission at its regularly scheduled meeting of Wednesday, June 12, 2024 and the Commission unanimously voted to recommend approval with the following conditions:

1. *Applicant shall monitor the success of reseeded areas to ensure stabilization. If stabilization is not successful within 30 days of seeding, the area will need to be reseeded.*

2. *Native wetland buffer shrub plantings shall be installed within the temporary accessway area in the Fall of 2024. This should be included in updated plan set for the Planning Board submission.*

Planning Department Recommendation

Wetland Conditional Use Permit
1) Vote to find that the Conditional Use Permit Application meets the requirements set forth in Section 10.1017.50 of the Ordinance and adopt the findings of fact as presented.

(Alt.) Vote to find that the Conditional Use Permit Application meets the requirements set forth in Section 10.1017.50 of the Ordinance and adopt the findings of fact as amended.

2.) Vote to grant the Conditional Use Permit with the following conditions:

2.1) Applicant shall monitor the success of reseeded areas to ensure stabilization. If stabilization is not successful within 30 days of seeding, the area will need to be reseeded.

2.2) A planting plan of the temporary accessway area shall be submitted to the Planning & Sustainability Department for review and approval.

III. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

E. The request of **Rosania RR & KL Revocable Trust (Owner),** for property located at **32 Boss Avenue** requesting a Conditional Use Permit in accordance with Section 10.440, Use 19.22 for a Home Occupation 2. Said property is located on Assessor Map 153 Lot 5 and lies within the Single Residence B (SRB) District. (LU-24-117)

Project Background

On June 17, 2024, the City Council adopted zoning amendments for home occupations. The amendments provide for client or general public visitation for a home occupation 1 and 2, which were previously not permitted. A home occupation 1 can have up to 2 clients at one time and is permitted in all zoning districts. A home occupation 2 can have up to 6 clients at one time and requires a Conditional Use Permit (CUP) in residential districts. The definitions are below for your reference. Both types of home occupations must comply with the requirements in main definition below:

Home occupation

An **office** or other **use** customarily conducted as an **accessory use** to a **dwelling**, complying with all the following standards:

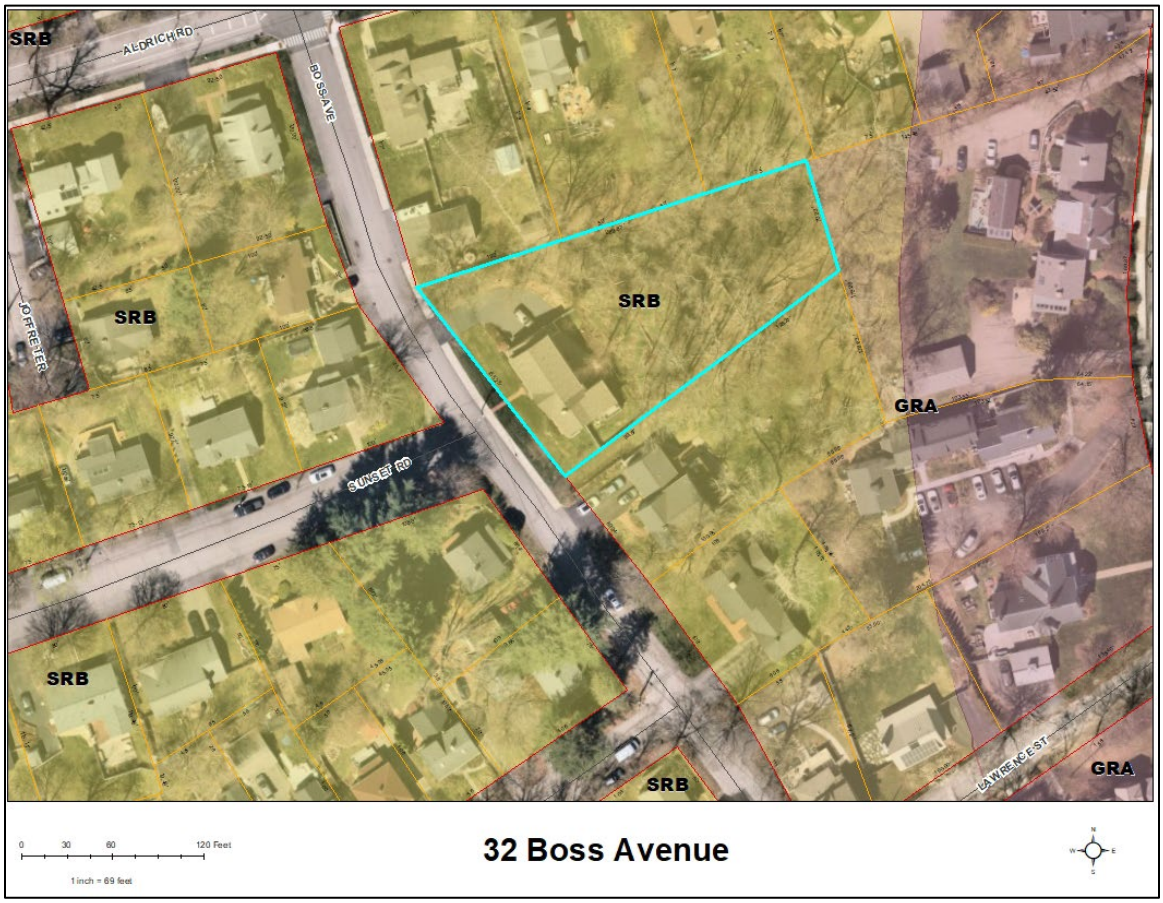
(a) Conducted entirely within a **dwelling** or an existing **accessory building**, and with no change to the character of the **dwelling** or **accessory building**;
(b) Maximum floor area of 300 square feet;
(c) No **outdoor storage** of materials or products;
(d) Outdoor parking of no more than one vehicle related to the **home occupation**;
(e) No deliveries by vehicles with more than two axles.

Home occupation 1

A **home occupation** with no nonresident employees; no **sign** related to the business; no more than 2 client, vendor or general public visitations at one time; and no deliveries other than by regular postal service and no more than one package delivery service truck (e.g., FedEx, UPS, etc.) per day.

Home occupation 2

A **home occupation** with not more than one nonresident employee and not more than 6 client, vendor or general public visitations at one time.



Project Review, Decisions, and Recommendations

The applicant is requesting a CUP for a home occupation 2 in an existing studio that is less than the 300 square foot maximum floor area for the use. While the applicant shows ample parking in the existing driveway, only one space can be designated for the home occupation use.

Per Section 10.860 Hours of Operation, a home occupation 2 is limited to the hours of 8 am – 5 pm unless different hours are established under a special exception or conditional use permit. The applicant is requesting the ability to have up to 2 classes per week from 6 – 9 pm and one day on the weekend.

Planning Department Recommendation

Home Occupation 2 Conditional Use Permit

1) Vote to find that the Conditional Use Permit application meets the criteria set forth in Section 10.243.20 and to adopt the findings of fact as presented.

(Alt.) Vote to find that the Conditional Use Permit application meets the criteria set forth in Section 10.243.20 and to adopt the findings of fact as amended and read into the record.

2) Vote to approve the conditional use permit with the following condition:

2.1) The home occupation may have up to 2 additional classes per week between the hours of 6 – 9 pm and one day on the weekend between the hours of 8 am – 5 pm.

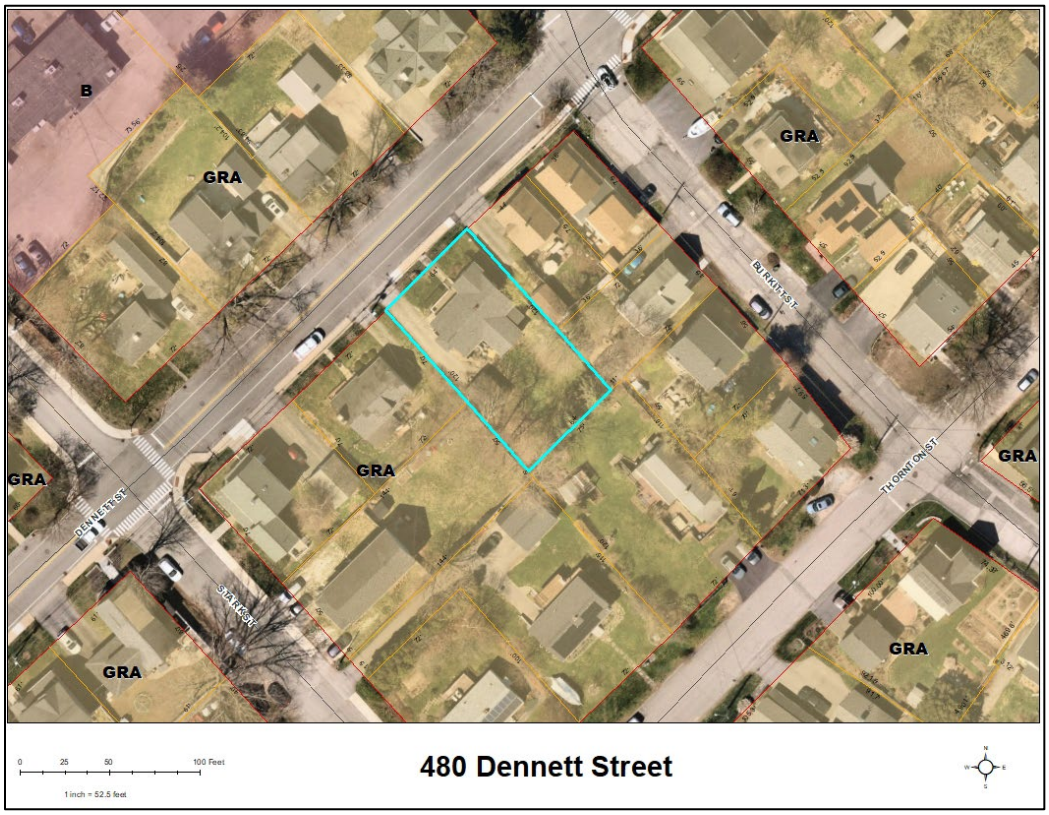
III. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

F. The P The request of **Mark E.** and **Janet Greenwood (Owners),** for property located at **480 Dennett Street** requesting a Conditional Use Permit from Section 10.814 for a Detached Accessory Dwelling Unit (DADU) for the demolition of the existing garage and construction of a new DADU Said property is located on Assessor Map 160 Lot 26 and lies within the General Residence A (GRA) District. (LU-24-120)

Project Background

The applicant is proposing to demolish the existing nonconforming garage and construct a new Detached Accessory Dwelling Unit (DADU) that will conform to the dimensional requirements in the GRA. The proposed DADU will be 750 sq. ft. and comply with all other dimensional and design requirements for a DADU.



Planning Department Recommendation
Detached Accessory Dwelling Unit Conditional Use Permit

1) Vote to find that the Conditional Use Permit Application meets the requirements set forth in Section 10.814.62 of the Ordinance and adopt the findings of fact as presented.

(Alt.) Vote to find that the Conditional Use Permit Application meets the requirements set forth in Section 10.814.62 of the Ordinance and adopt the findings of fact as amended.

2) Vote to grant the Conditional Use Permit with the following conditions:

2.1) Documentation of the conditional use permit approval shall be recorded at the Rockingham County Registry of Deeds, together with an affidavit that either the principal dwelling unit or the accessory dwelling unit will be occupied by the owner of the dwelling as the owner's principal place of residence, as required by Section 10.814.22.

2.2) A certificate of use issued by the Planning Department is required to verify compliance with the standards of this Section, including the owner occupancy and principal residency requirements. Said certificate shall be issued by the Planning Department upon issuance of a certificate of occupancy by the Inspection Department. A certificate of use shall not be issued prior to recording of documentation as required by this Ordinance.

2.3) The certificate of use shall be renewed annually upon submission of such documentation as the Planning Department may require to verify continued compliance with the standards of this Section. Failure to comply with this requirement shall be deemed a violation of the ordinance and may be enforced as provided in Article 2.

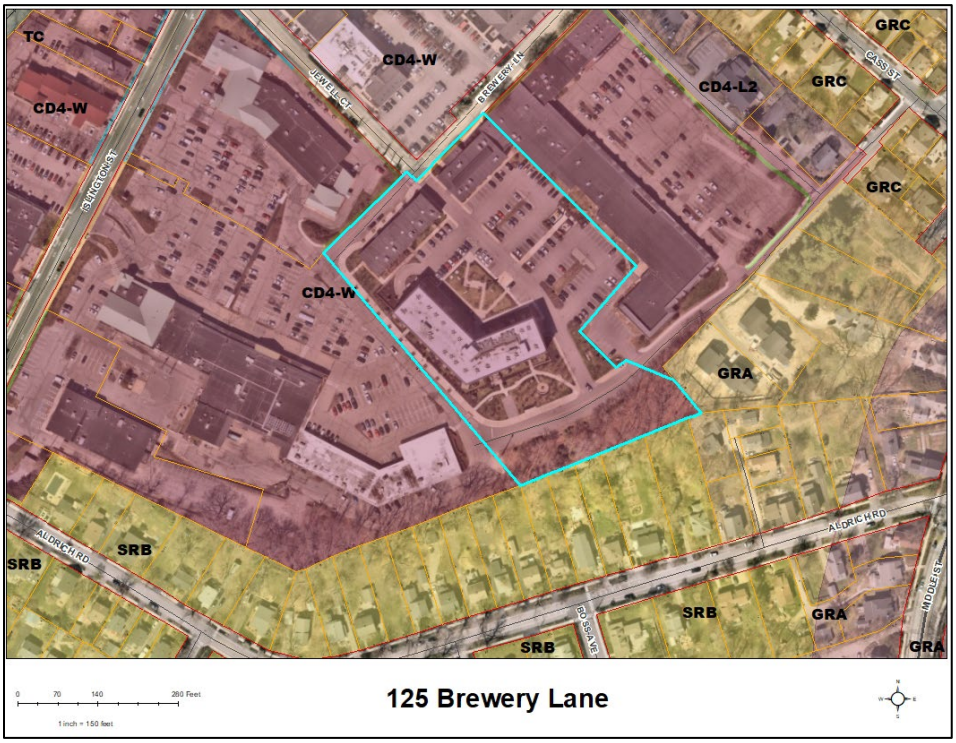
III. PUBLIC HEARINGS – NEW BUSINESS

The Board's action in these matters has been deemed to be quasi-judicial in nature. If any person believes any member of the Board has a conflict of interest, that issue should be raised at this point or it will be deemed waived.

G. The request of **Portsmouth West End Development LLC (Owner**), for property located at **125 Brewery Lane** requesting a Conditional Use Permit in accordance with Section 10.440, Use 19.50 for an outdoor dining and drinking area as an accessory use. Said property is located on Assessor Map 154 Lot 2 and lies within the Character District 4-W (CD-4W) District. (LU-24-108)

Background

The property is located in the CD4-W district, where an outdoor dining and drinking area requires a conditional use permit as an accessory use to a principal use. The applicant is proposing to add picnic tables and bistro tables and chairs to an area at the back of the building which faces the existing parking lot. The proposal includes expanding the gravel area to accommodate the tables and chairs.



Planning Department Recommendation

Outdoor Dining Conditional Use Permit

1) Vote to find that the Conditional Use Permit application meets the criteria set forth in Section 10.243.20 and to adopt the findings of fact as presented.

(Alt.) Vote to find that the Conditional Use Permit application meets the criteria set forth in Section 10.243.20 and to adopt the findings of fact as amended and read into the record.

2) Vote to approve the conditional use permit as presented.

IV. PRELIMINARY CONCEPTUAL CONSULTATION AND DESIGN REVIEW

A. The request of **Frances E. Mouflouze Revocable Trust of 2015 (Owner),** for property located at **550 Sagamore Avenue** requesting preliminary Conceptual Consultation for a subdivision of one lot into three conforming lots with associated site improvements. Said property is located on Assessor Map 222 Lot 11 and lies within the Single Residence B (SRB) District. (LUPD-24-5)

The applicant has provided a set of preliminary plans for discussion with the Board. As authorized by NH **RSA 676:4,II**, the Site Plan Regulations require preliminary conceptual consultation for certain proposals, including (1) the construction of 30,000 sq. ft. or more gross floor area, (2) the creation of 20 or more dwelling units, or (3) the construction of more than one principal structure on a lot. Preliminary conceptual consultation precedes review by the Technical Advisory Committee. Preliminary consultation is not required for this application, however the applicant wanted to get feedback from the Board prior to submitting a formal TAC application for site plan and subdivision approval.

Preliminary conceptual consultation is described in the state statute as follows: *[Preliminary conceptual consultation] … shall be directed at review of the basic concept of the proposal and suggestions which might be of assistance in resolving problems with meeting requirements during final consideration. Such consultation shall not bind either the applicant or the board and statements made by planning board members shall not be the basis for disqualifying said members or invalidating any action taken. The board and the applicant may discuss proposals in conceptual form only and in general terms such as desirability of types of development and proposals under the master plan.*

The preliminary conceptual consultation phase provides the Planning Board with an opportunity to review the outlines of a proposed project before it gets to detailed design (and before the applicant refines the plan as a result of review by the Technical Advisory Committee and public comment at TAC hearings). In order to maximize the value of this phase, Board members are encouraged to engage in dialogue with the proponent to offer suggestions and to raise any concerns so that they may be addressed in a formal application. Preliminary conceptual consultation does not involve a public hearing, and no vote is taken by the Board on the proposal at this stage. Unlike Design Review, completion of Preliminary Conceptual Consultation does not vest the project to the current zoning.

B. 361 Hanover Steam Factory, LLC (Owner), for property located at **361 Hanover Street**, requesting Preliminary Conceptual Consultation for the construction of a new building along Hanover Street with a 20-foot tunnel entrance from Hanover Street to a central courtyard between the new building and the existing 361 Hanover Street (Portsmouth Steam Factory) building. The courtyard will provide access to the indoor parking areas at both the existing and the new building. The upper floors of the new Hanover Street building will contain 12 residential dwelling units and the Portsmouth Steam Factory Building would contain 24 dwelling units; for a total of 36 dwelling units. There would be 72 off-street parking spaces in the aggregate. (LUPD-24-3)

The applicant has provided a set of preliminary plans for discussion with the Board. As authorized by NH **RSA 676:4,II**, the Site Plan Regulations require preliminary conceptual consultation for certain proposals, including (1) the construction of 30,000 sq. ft. or more gross floor area, (2) the creation of 20 or more dwelling units, or (3) the construction of more than one principal structure on a lot. Preliminary conceptual consultation precedes review by the Technical Advisory Committee.

Preliminary conceptual consultation is described in the state statute as follows: *[Preliminary conceptual consultation] … shall be directed at review of the basic concept of the proposal and suggestions which might be of assistance in resolving problems with meeting requirements during final consideration. Such consultation shall not bind either the applicant or the board and statements made by planning board members shall not be the basis for disqualifying said members or invalidating any action taken. The board and the applicant may discuss proposals in conceptual form only and in general terms such as desirability of types of development and proposals under the master plan.*

The preliminary conceptual consultation phase provides the Planning Board with an opportunity to review the outlines of a proposed project before it gets to detailed design (and before the applicant refines the plan as a result of review by the Technical Advisory Committee and public comment at TAC hearings). In order to maximize the value of this phase, Board members are encouraged to engage in dialogue with the proponent to offer suggestions and to raise any concerns so that they may be addressed in a formal application. Preliminary conceptual consultation does not involve a public hearing, and no vote is taken by the Board on the proposal at this stage. Unlike Design Review, completion of Preliminary Conceptual Consultation does not vest the project to the current zoning.

This project was before the Board in April for Preliminary Conceptual Consultation and then Design Review in May in order to vest the zoning. The

applicant has made substantial changes to the project based on input from the public and the Planning Board and wanted to present the new plan to the Board prior to seeking variances for certain elements of the project.

V. OTHER BUSINESS

A. Chairman's Updates and Discussion Items

B. Board Discussion of Regulatory Amendments and Other Matters

VI. ADJOURNMENT

PLANNING BOARD
PORTSMOUTH, NEW HAMPSHIRE

EILEEN DONDERO FOLEY COUNCIL CHAMBERS
CITY HALL, MUNICIPAL COMPLEX, 1 JUNKINS AVENUE

7:00 PM Public Hearings begin **June 20, 2024**

MEMBERS PRESENT: Rick Chellman, Chairman; Greg Mahanna, Vice Chair; Karen Conard, City Manager; Joseph Almeida, Facilities Manager; Beth Moreau, City Councilor; James Hewitt; Paul Giuliano; Andrew Samonas; Anthony Coviello; and William Bowen, Alternate

ALSO PRESENT: Peter Stith, Planning Department Manager

MEMBERS ABSENT: None.

Chair Chellman called the meeting to order at 7:00 p.m. He stated that Mr. Coviello would arrive at the meeting later and that Alternate Mr. Bowen would take a voting seat until then.

I. APPROVAL OF MINUTES

A. Approval of the May 16, 2024 meeting minutes.

*Vice-Chair Mahanna moved to **approve** the May 16 minutes as **amended**, seconded by Councilor Moreau and with Mr. Hewitt abstaining. The motion passed unanimously.*

II. DETERMINATIONS OF COMPLETENESS

SITE PLAN REVIEW

A. The request of **Friends of Lafayette House in care of Melanie Merz (Owner),** for property located at **413 Lafayette Road** requesting Site Plan Review Approval to construct an attached caretaker's unit to the existing residential care facility with associated site improvements. Said property is located on Assessor Map 230 Lot 23A and lies within the Single Residence B (SRB) District.

*Councilor Moreau moved that the Board determine that Item A is complete according to the Site Plan Review Regulations (contingent on the granting of any required waivers under Section IV of the agenda) and to accept the application for consideration. Vice-Chair Mahanna seconded. The motion **passed** unanimously.*

III. PUBLIC HEARINGS – NEW BUSINESS

A. The request of **Edmund R. St. Pierre (Owner)**, for property located at **15 Mariette Drive** requesting a Conditional Use Permit from Section 10.814 for a Detached Accessory Dwelling Unit. Said property is located on Assessor Map 292 Lot 167 and lies within the Single Residence B (SRB) District. (LU-24-57)

SPEAKING TO THE PETITION

[Timestamp 4:30] The applicant Edmund St. Pierre was present. He reviewed the petition and described what the proposed detached Accessory Dwelling Unit (ADU) would look like.

[Timestamp 7:58] Vice-Chair Mahanna noted that the applicant said he wanted to downsize and asked if the applicant would live in it. Mr. St. Pierre said he designed the ADU for himself or his sister to live in. Councilor Moreau said the applicant said a second-floor full bathroom was proposed but that he mentioned a half bath on the first floor. Mr. St. Pierre said the first-floor full bathroom would go away with the renovation. Chair Chellman said the applicant proposed to renovate part of the first floor into the ADU but that one of the plans showed the entire first floor going into the ADU. Mr. St. Pierre said he originally designed a handicap accessible first floor but did not follow through with it because of the square footage.

Chair Chellman opened the public hearing.

SPEAKING TO, FOR, OR AGAINST THE PETITION

No one spoke, and Chair Chellman closed the public hearing.

DECISION OF THE BOARD

Councilor Moreau moved that the Board find that the Conditional Use Permit Application meets the requirements set forth in Section 10.814.62 of the Ordinance and adopt the findings of fact as presented. Ms. Conard seconded. The motion ***passed*** *unanimously.*

Councilor Moreau moved that the Board grant the Conditional Use Permit with the following conditions:

2.1) Documentation of the conditional use permit approval shall be recorded at the Rockingham County Registry of Deeds, together with an affidavit that either the principal dwelling unit or the accessory dwelling unit will be occupied by the owner of the dwelling as the owner's principal place of residence, as required by Section 10.814.22.

2.2) A certificate of use issued by the Planning Department is required to verify compliance with the standards of this Section, including the owner occupancy and principal residency requirements. Said certificate shall be issued by the Planning Department upon issuance of a certificate of occupancy by the Inspection Department. A certificate of use shall not be issued prior to recording of documentation as required by this Ordinance.

2.3) The certificate of use shall be renewed annually upon submission of such documentation as the Planning Department may require to verify continued compliance with the standards of this Section. Failure to comply with this requirement shall be deemed a violation of the ordinance and may be enforced as provided in Article 2.

*Ms. Conard seconded. The motion **passed** unanimously.*

B. The request of **Richard M.** and **Francoise S. Kinney (Owners),** for property located at **89 Cliff Road** requesting an after the fact Wetland Conditional Use Permit from Section 10.1017.50 for violations within the City's 100' wetland buffer. A three-season porch, deck and concrete landing pad were constructed without permits, of which 225 s.f. is within the buffer. Said property is located on Assessor Map 223 Lot 9 and lies within the Single Residence B (SRB) District. (LU-24-54)

SPEAKING TO THE PETITION

[Timestamp 13:00] The applicant Richard Kinney was present to review the petition. He said a 3-season porch, adjoining deck, and concrete landing pad were added that intruded 225 square feet into the wetland buffer. He said he worked with the Conservation Commission to mitigate the impact onto the buffer, which included putting in a drywell, adding gravel under the porch and deck, extending the downspout out from the north side of the house, and adding shrubs and a recessed planting area. He said a microclover lawn mix would replace the back yard's grass.

The Board had no questions, and Chair Chellman opened the public hearing.

SPEAKING TO, FOR, OR AGAINST THE PETITION

No one spoke, and Chair Chellman closed the public hearing.

DECISION OF THE BOARD

*Mr. Giuliano moved that the Board find that the Conditional Use Permit Application meets the requirements set forth in Section 10.1017.50 of the Ordinance and adopt the findings of fact as presented. Mr. Almeida seconded. The motion **passed** unanimously.*

Mr. Giuliano moved that the Board grant the Conditional Use Permit with the following condition:

2.1) In accordance with Section 10.1018.40 of the Zoning Ordinance, applicant shall install permanent wetland boundary markers where applicable. In addition to the wetland boundary markers, an educational sign describing the project shall be installed near the restoration area and fencing should be utilized to keep disturbances such as dogs and geese from the area.

*Ms. Conard seconded. The motion **passed** unanimously.*

C. The request of **Wentworth Senior Living (Applicant),** and **MH Wentworth HM** for **CHRNC INV (Owner),** for property located at **346 Pleasant Street** is requesting a Wetland Conditional Use Permit from Section 10.1017.50 to replace an existing wooden fence along the back of the property which abuts the South Mill Pond. This replacement project will have approximately 200 s.f. of impact within the buffer, with 10 s.f. of permanent impact below ground with the posts and 500 linear feet of permanent impact from the fence. Said property is located on Assessor Map 109 Lot 10 and lies within the General Residence B (GRB) District. (LU-24-63)

SPEAKING TO THE PETITION

[Timestamp 19:12] Madison Abbott representing Wentworth Senior Living was present to review the petition. She said they wanted to replace 510 linear feet of wooden fence, most of which occurred within the 100-ft wetland buffer. She said the reason for going through the whole permit requirement and not just an exception was because they had about 50 linear feet within the 25-ft vegetation buffer. She said they were past the point of repairing and explained how the installation method would be the least disruptive as possible.

[Timestamp 20:11] Councilor Moreau said it wasn't clear which fence would be installed. Ms. Abbott said they currently had a scalloped picketed fence that they wanted to replace with a vinyl one that would have the same look but be more durable. Chair Chellman asked if it was shiny. Ms. Abbott said it would be for a few years. She said one of the Conservation Commission's stipulations was that a regular maintenance plan be followed and that only pressurized washing with water be done. Vice-Chair Mahanna said it was an interesting choice by the applicant to oppose what the Historic District Commission (HDC) suggested. Ms. Abbott said the HDC approved the vinyl material but that the Conservation Commission suggested that other options be explored. She said an Azek material would have been a choice but it was four times the cost of the vinyl fence. Vice-Chair Mahanna said he would have preferred a non-shiny wooden fence, especially since Wentworth Senior Living was a public place. Ms. Abbott said they had about 90 feet of frontage on Pleasant Street, with a concrete wall that included a wooden fence above it. She said eventually they would replace the fence with another wood one. Mr. Almeida noted that the front of the building was painstakingly restored and maintained and there was a total rebuild of the fence in the front. Chair Chellman asked Ms. Abbott if she would accept a condition that the fence along Pleasant Street would remain wood. Ms. Abbott agreed.

Chair Chellman opened the public hearing.

SPEAKING TO, FOR, OR AGAINST THE PETITION

No one spoke, and Chair Chellman closed the public hearing.

DECISION OF THE BOARD

*Councilor Moreau moved that the Board find that the Conditional Use Permit Application meets the requirements set forth in Section 10.1017.50 of the Ordinance and adopt the findings of fact as presented. Ms. Almeida seconded. The motion **passed** unanimously.*

Councilor Moreau moved that the Board grant the Conditional Use Permit with the following conditions:

2.1) In accordance with Section 10.1018.40 of the Zoning Ordinance, applicant shall install permanent wetland boundary markers where applicable. In addition to the wetland boundary markers, an educational sign describing the project shall be installed near the restoration area and fencing should be utilized to keep disturbances such as dogs and geese from the area.

2.2) Maintenance for the new fencing shall include power washing with water only.

2.3) Fencing along Pleasant Street if replaced, will remain the current material that exists.

*Mr. Almeida seconded. The motion **passed** unanimously.*

D. The request of **Friends of Lafayette House in care of Melanie Merz (Owner),** for property located at **413 Lafayette Road** requesting Site Plan Review Approval to construct an attached caretaker's unit to the existing residential care facility with associated site improvements. Said property is located on Assessor Map 230 Lot 23A and lies within the Single Residence B (SRB) District. (LU-23-208)

SPEAKING TO THE PETITION

[Timestamp 27:55] Project engineer Joe Coronati was present to review the petition on behalf of the applicant, along with Friends of Lafayette House Executive Director Renee Sullivan and board member Melanie Merz. Mr. Coronati said the Friends of Lafayette House took care of twelve developmentally disabled adults. He said the full-time caretaker lived on the property and worked five days a week and a part-time caretaker worked on the weekend and stayed with the full-time caretaker then. He said the expansion was needed to add a one-story addition to the building so that the full-time caretaker had his own apartment. He said there would be no change to the number of residents or anything external except to modify the walkway.

[Timestamp 30:42] Councilor Moreau asked how people went in and out of the building. Mr. Coronati showed where the main entrance was and said it would not change. Chair Chellman said the site plan showed two accesses and asked if the one farther away was the main entrance. Mr. Coronati said the addition would be on the end of the building that had the boiler and storage rooms and would not alter any of the doorways or access points into the building. He said there would be a new entrance to the caretaker's unit. Councilor Moreau said the entrance on the right looked like it went into a kitchen. Mr. Coronati said there was an entrance on the long wall and egress doors that were fenced in and secured for residents. Mr. Bowen said there was plenty of parking at random times and that he assumed that most of the residents didn't drive but would have visitors. He asked if the parking would change and Mr. Coronati said it would not. Mr. Giuliano said the waiver request, Article 10, Outdoor Lighting, indicated that the applicant was

proposing additional lighting, and he asked if the applicant meant to say that they were not proposing additional lighting. Mr. Coronati agreed. He said there might be one residential light over entrance door that would be controlled by the caretakers and that there was one outside light that wasn't in the best of shape that may end up being removed.

Chair Chellman opened the public hearing.

SPEAKING TO, FOR, OR AGAINST THE PETITION

No one spoke, and Chair Chellman closed the public hearing.

DECISION OF THE BOARD

Mr. Giuliano moved that the Board find that the Site Plan Application meets the requirements set forth in the Site Plan Regulations Section 2.9 Evaluation Criteria and adopt the findings of fact as presented. Vice-Chair Mahanna seconded. The motion ***passed*** *unanimously.*

Mr. Giuliano moved that the Board find that the requested waivers will not have the effect of nullifying the spirit and intent of the City's Master Plan or the Site Plan Review Regulations, and to waive the regulations as requested. Councilor Moreau seconded.

Councilor Moreau said it was a little addition that would not really change the function or how the place works, so she agreed that the waivers were acceptable.

Mr. Giuliano moved that the Board grant Site Plan approval with the following conditions:

Conditions to be satisfied subsequent to final approval of site plan but prior to the issuance of a building permit or the commencement of any site work or construction activity:

3.1) The site plan and any easement plans and deeds shall be recorded at the Registry of Deeds by the City or as deemed appropriate by the Planning Department.

Ms. Conard seconded. The motion ***passed*** *unanimously.*

E. 806 US Route 1 Bypass requesting Amended Site Plan Approval and a second 1-Year extension to the Site Plan Approval originally granted on June 23, 2022. (LU-22-81)

SPEAKING TO THE PETITION

[Timestamp 38:23] Project engineer Alex Ross was present on behalf of the applicant, with builder Dave Grzybowski. Mr. Ross said they were before the Board a month ago for the abutting site because of the off-site draining. He said it was the same as the present site, and he reviewed the existing conditions plan and the drainage. He said there were several design options reviewed by the City and the NHDOT and that A22 was approved, so now they had the proposed changes before the Board to get the amended plan set and extension approved.

[Timestamp 40:13] Mr. Giuliano said he had asked at the previous meeting what the property's use would be. Mr. Ross said property was currently City Tobacco and it was just a small building, so the owner wanted to move next door. He said the small building could be rented out or used for something else. Mr. Grzybowski said that after the move, the place would be empty but the applicant would come back before the Board for any change in use or if any business went in. Chair Chellman noted that an approved walk-in cooler would be added to the back of it to make the approved square footage.

Chair Chellman opened the public hearing.

SPEAKING TO, FOR, OR AGAINST THE PETITION

No one spoke, and Chair Chellman closed the public hearing.

DECISION OF THE BOARD

Councilor Moreau moved that the Board find that the Site Plan Application meets the requirements set forth in the Site Plan Regulations Section 2.9 Evaluation Criteria and adopt the findings of fact as presented. Ms. Conard seconded. The motion ***passed*** *unanimously.*

Councilor Moreau moved that the Board grant amended site plan approval and a second one-year extension with the original conditions as approved on June 23, 2022 and the following conditions:

Conditions to be satisfied subsequent to final approval of site plan but prior to the issuance of a certificate of occupancy and release of the surety:

2.1) The Engineer of Record shall submit a written report (with photographs and engineer stamp) certifying that the stormwater infrastructure was constructed to the approved plans and specifications and will meet the design performance;

2.2) A stormwater inspection and maintenance report shall be completed annually and copies shall be submitted for review to the City's Stormwater Division/ Public Works Department.

Ms. Conard seconded. The motion ***passed*** *unanimously.*

F. The Planning Board will hold a public hearing on the following amendments to Chapter 10, Article 5A - Character-Based Zoning, Section 10.5A43.33 regarding Building and Story Heights of the ZONING ORDINANCE of the City of Portsmouth, pursuant to Section 10.150 of the Zoning Ordinance.

[Timestamp 44:10] Chair Chellman asked if the Board members had a chance to look at the amendments. Mr. Hewitt said he didn't have time and preferred postponing it to give the Board members more time to look at the amendments carefully. Chair Chellman said it was a modification to something that was done last August, so it wasn't brand new. He said there was a question about whether there was a requirement to have workforce housing as part of the

proponent's application to qualify for the additional height story of building. He said it was corrected and that he requested that the Board members look at the other sections because the community space definitions were not what they would think. He said it included things like plazas and pedestrian passageways and was much more than greenspace. Vice-Chair Mahanna said he didn't get a chance to read the email. Councilor Moreau said the question was whether it needed to be mixed use residential and nonresidential uses for the incentives to be taken advantage of. She said that was why the City Council was trying to clarify that section because it was not as clear as what the intention was.

Chair Chellman said the original text included the phrase 'and/or' and that it could be confusing. He said it was meant to be a possible mix of building types. He said he also thought the 50 percent requirement for community space was high and a big ask as well as a detriment to the incentive itself. He said the Board might want to discuss whether they would want to suggest to the Council to reduce it. Vice-Chair Mahanna said it could be scaled down. Chair Chellman said he was thinking of scaling it down to half. Mr. Bowen asked if it would apply to the Steam Factory, and Chair Chellman said it would not because the Incentive Overlay District did not apply. He said there would have to be a one-acre minimum as well. He noted that the McIntyre and Citizens Bank properties would qualify as well as a few other properties. Vice-Chair Mahanna suggested that the Board receive more information to inform them on what they were deciding on for the next time they considered it. Councilor Moreau said there was a lot of discussion about the 50 percent community space at the Land Use Committee meeting, and due to the density and size of the one acre or more lots, trying to get as much community space as possible was very important, so she would not be in favor of trying to change that at this time. Chair Chellman said the building types included houses, and there had been discussion that The Hill, for example, was a nonconforming situation that could not be built downtown under the existing zoning but that it could be theoretically built on the Citizens Bank property with houses, so it would qualify for that type of development on that site. He said he thought it would be more difficult to do with a 50 percent community space allocation. Ms. Conard asked if the City Council could act in the absence of the Planning Board acting. Chair Chellman said the zoning ordinance required the Planning Board to make a recommendation to the City Council. He said he would be okay with revisiting the community space issue in the future. He said the other sections were strategically more important, especially the goal for workforce housing.

Ms. Conard moved to recommend that the City Council take up the new section as amended as of that day to the Planning Board. Mr. Giuliano seconded.

[Timestamp 53:47] There was further discussion about whether the Board would have the authority to grant an extra layer of height or extra floor in exchange for 5 or 10 percent being controlled rent price and 50 percent being greenspace. Chair Chellman said it was community space, not greenspace, and said examples would include pedestrian passageways, wide pedestrian sidewalks, pedestrian arcades, pocket parks, playgrounds, public observation decks, and that there was a requirement to include a plaza or square of at least 5,000 sf per acre. Chair Chellman said none of those were greenspaces and were hardscaped community spaces. Mr. Bowen asked if there was no discretion on a proposal that would conform to those conditions. Chair Chellman said it would be a Conditional Use Permit, so there was discretion involved and

some back-and-forth. He said if an applicant met all the requirements, the Board was supposed to grant it. Mr. Bowen said the average person thought of community space as greenspace. Vice-Chair Mahanna said he supported the clarification but thought the Board should see the normal overlay that showed the properties to be affected. Chair Chellman said none of the applicable properties were changing in any way and that very few could qualify. Vice-Chair Mahanna said it was a burden for the developer to have 50 percent of an acre for community space. Mr. Almeida agreed and said he thought part of the purpose of the amendment was due to workforce housing and thought it would encourage and discourage workforce housing at the same time. Chair Chellman said the motion was to correct the mistake. He said he was inclined to vote it up but that the Board could come back to it because workforce housing was a big topic.

*Ms. Conard **amended** her motion as follows:*

Ms. Conard moved that the Board vote to recommend to City Council to approve the zoning amendments as amended and to hold first reading and to convey the discussion the Board had about the 50% community space requirement. Mr. Giuliano seconded.

[Timestamp 1:01:22] There was further discussion. Mr. Samonas said one of the ways to achieve better public and community space results were amenities that welcomed the public, as opposed to wider pedestrian sidewalks. He said the second community space objective was to break up the massing of some of the larger north end projects that tried to utilize the parcel and drive economic return but created congestion. He said the workforce housing objective set the threshold so high that the developer had to come before the Board to ask if they would end up at 50 percent, but at least it allowed them to discuss it before the Board. He noted that the amendment mentioned the term 'as further described'. He said the revisions helped the Board get a cohesive view of all the considerations, and if they had the figures and entire zoning ordinance in front of them, it helped to get the full big picture. Chair Chellman said it was not a change in any of that, however. He said if a second version of it happened, the first sentence about community space could be changed to say that "at least a smaller amount and up to 50 percent or whatever the range would be" to have a provision where the applicant is required to show both and have a discussion with the Board. It was further discussed. Mr. Hewitt said it may be a logical step but that he had to vote in opposition due to the nine hours' notice. Mr. Giuliano said Mr. Samonas brought up a good points about the large projects in the north end, and it was further discussed. Mr. Almeida said he would support the motion because the Board was correcting minor language changes, but in the future they would need more discussion. Councilor Moreau said she could bring up the 50 percent issue at the City Council meeting.

*The motion **passed** 7-2, with Member Hewitt and Vice-Chair Mahanna voting against.*

Note: At this point in the meeting, Mr. Coviello arrived and took his voting seat, and Mr. Bowen went back to alternate status.

IV. CITY COUNCIL REFERRALS

A. Chapter 10, Article 5A - Character-Based Zoning (*See item F. above*)

See Item F above.

V. OTHER BUSINESS

A. 325 Little Harbor Road requesting a 1-Year Extension to the Wetland Conditional Use Permit originally granted on July 20, 2023. (LU-23-81)

DECISION OF THE BOARD

Councilor Moreau moved that the Board grant a one-year extension to the Planning Board Approval of the Conditional Use Permit to July 20, 2025. Mr. Almeida seconded. The motion ***passed*** *unanimously.*

B. Chairman Updates and Discussion Items

[Timestamp 1:14:00] Chair Chellman said there was a desire to go through the Board's site plan and subdivision regulations that had not had attention for some time, and the Legal Department wanted to have a meeting with a Planning Board subcommittee. Mr. Coviello and Mr. Bowen volunteered. Chair Chellman said he would set it up.

C. Board Discussion of Regulatory Amendments, Master Plan Scope & Other Matters

[Timestamp 1:14:51] Chair Chellman said a draft of the Master Plan Scope would go out to the Board members for a proposed RFQ similar to what the City did with the Sherburne school.

Mr. Coviello said he and Mr. Bowen were at a housing conference where Assistant Mayor Joanna Kelley spoke and said that the City Council collected data on new housing and the number of students that came out of that new housing. He asked if that data was available to the Board. Councilor Moreau said it was the Parson Woods in the west end and that two students were designated for Little Harbour School. Mr. Coviello asked if it were possible to have data on calls for service from Police and Fire, and Ms. Conard said she would find out.

VI. ADJOURNMENT

The meeting adjourned at 8:20 p.m.

Respectfully submitted,

Joann Breault
Planning Board Recording Secretary

L0700-026C
June 14, 2024

Mr. Rick Chellman, Chairman
City of Portsmouth Planning Board
1 Junkins Avenue
Portsmouth, New Hampshire 03801

Re: **Lonza Biologics – Proposed PV Solar Carports**
Amended Site Plan Review Application LU-23-108

Dear Chairman Chellman:

On behalf of Lonza Biologics, Inc. (Lonza), we are pleased to submit one (1) set of hard copies and one electronic file (.pdf) of the following information to support a request to the Planning Board for a recommendation for approval to the Pease Development Authority (PDA) for Amended Site Plan Review for proposed PV Solar Carports located at 5 Technology Way, (Formerly 70 Corporate Drive) on Pease International Tradeport:

- PDA Application for Site Review, dated May 20, 2024;
- Site Plan Set, last revised May 20, 2024;
- Drainage Memo, dated May 20, 2024;
- Glare Study Results, dated February 22, 2024;

PROJECT SUMMARY

Background

The existing project was granted Site Plan approval on January 17, 2019, and amended by administrative approvals on September 27, 2019, January 27, 2023, and Amended Site Plan Approval on November 16, 2023.

Existing Condition

The project is located on the portion of Lonza's 46-acre parcel refered to as the Iron Parcel. The following summarizes the work currently approved through the November 16, 2023 Amended Site Plan Approval:

- Daylighting of Hodgson Brook on the Iron Parcel
- Removal of the existing Hodgson Brook culvert
- Construction of the sidewalk and landscaping along Corporate Drive
- Completion of Soils Management Plan
- Construction of Building #1
- Construction of the Central Utility Building
- Construction site improvements for Building #1 such as drive aisles, fire lanes, utilities, lighting, sidewalks and stormwater management.
- Construction of a temporary 150-space surface parking lot, sidewalks and stormwater management.

Amended Site Plan

The requested Site Plan amendment includes the construction of Photovoltaic Cell (PV) Solar canopies over the previously approved temporary surface parking lot. The addition of these Solar Canopies is being requested to support Lonza Biologics green infrastructure and sustainability initiatives. The addition of these Solar canopies will not result in any dimensional changes to the previously approved parking lot. There is a slight increase in impervious surfaces (~672 SF) which will not cause any adverse impact to the previously approved Phase 2 Drainage design as outlined in the Drainage Memorandum.

The proposed PV Solar system will require additional electrical infrastructure and modifications to the photometric lighting design as depicted in the enclosed Site Plan Set. The proposed system is being designed to supplement and reduce the proposed project's overall electrical demand.

The project also received a recommendation for approval from the Technical Advisory Committee (TAC) at their June 4, 2024, meeting. We respectfully request to be placed on the Planning Board (PB) meeting agenda for July 18, 2024. If you have any questions or need any additional information, please contact Neil Hansen by phone at (603) 294-9213 or by email at nahansen@tighebond.com.

Sincerely,

TIGHE & BOND, INC.

Neil A. Hansen, PE
Project Manager

Patrick M. Crimmins, PE
Vice President

Copy: Lonza Biologics (via email)
Pease Development Authority

J:\L\L0700 Lonza Biologics Expansion was 1576F\026_Project Albacore\Report_Evaluations\Applications\City of Portsmouth\20240614_Solar PB Submission\L0700-026C_PB Cover Letter.docx

Pease Development Authority
55 International Drive, Portsmouth, NH 03801, (603) 433-6088

Application for Site Review

For PDA Use Only			
Date Submitted:_____	Municipal Review:_____	Fee:_____	
Application Complete:_____	Date Forwarded:_____	Paid:_____	Check #:_____

Applicant Information

Applicant: Lonza Biologics, Inc.	Agent: Tighe & Bond, Inc.
Address: 101 International Drive Portsmouth, NH 03801	Address: 177 Corporate Drive Portsmouth, NH 03801
Business Phone: 603-570-3625	Business Phone: 603-433-8818
Mobile Phone:	Mobile Phone:
Fax:	Fax:

Site Information

Portsmouth Tax Map: 305	Lot #: 006	Zone: Airport, Business, Commercial
Site Address / Location : 101 International Drive, Portsmouth, NH 03801		
Site Address / Location :		Area of On-site Wetlands: 4,087 SF

Activity Information

Change of Use: Yes [ ] No [X] Existing Use: Office/Research/Manufacturing

Proposed Use: Office/Research/Manufacturing

Description of Project:

The requested Site Plan amendment includes the construction of Photovoltaic Cell (PV) Solar canopies over the previously approved temporary surface parking lot.

All above information shall be shown on a site plan submitted with this application. Provide 3 full size hard copies and one PDF copy of all application materials as well as one half-size set of drawings to PDA. Applicant shall supply additional copies as may be required by applicable municipality. Refer to Chapter 400 of PDA land Use Controls for additional information.

Certification

I hereby certify under the penalties of perjury that the foregoing information and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I hereby apply for Site Review and acknowledge I will comply with all regulations and any conditions established by the Review Committee(s) and PDA Board in the development and construction of this project.

Signature of Applicant — 20 May 24 — Date

Michael Feeney
Printed Name

N:\Engineer\ ApplicationforSiteReview.xlsx

IRON PARCEL DEVELOPMENT - SOLAR

5 TECHNOLOGY WAY

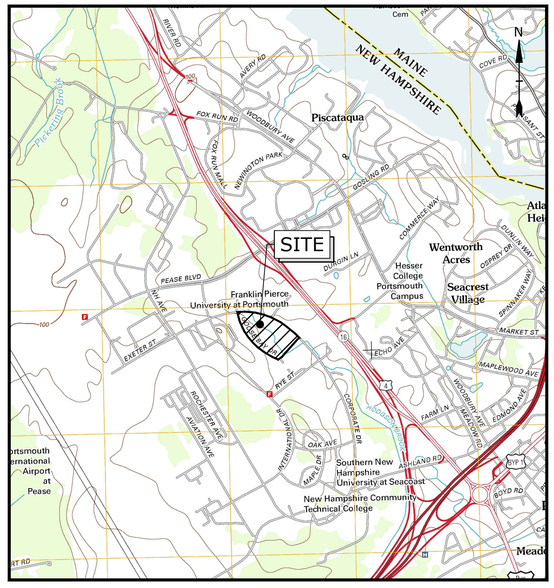
(FORMERLY 70 CORPORATE DRIVE)

PORTSMOUTH, NEW HAMPSHIRE

PROJECT NO: L-0700-26

MAY 20, 2024

LIST OF DRAWINGS		
SHEET NO.	SHEET TITLE	LAST REVISED
	COVER SHEET	5/20/2024
C-161	PHASE 2 DEMOLITION PLAN	5/20/2024
C-164	PHASE 2 OVERALL SITE PLAN	5/20/2024
C-165	PHASE 2 SITE PLAN	5/20/2024
C-168	PHASE 2 GRADING, DRAINAGE & EROSION CONTROL PLAN	5/20/2024
C-171	PHASE 2 UTILITIES PLAN	5/20/2024
C-174	PHASE 2 LANDSCAPE PLAN	5/20/2024
C-177	PHASE 2 PHOTOMETRIC LIGHTING PLAN	5/20/2024
C-501	EROSION CONTROL NOTES & DETAILS SHEET	5/20/2024
C-503	DETAILS SHEET	5/20/2024
8-046-3	SOLAR CANOPY DETAILS	5/20/2024



LOCATION MAP
SCALE: 1" = 2,000'

LESSOR:	PEASE DEVELOPMENT AUTHORITY 55 INTERNATIONAL DRIVE PORTSMOUTH, NEW HAMPSHIRE 03801
CLIENT:	LONZA BIOLOGICS 101 INTERNATIONAL DRIVE PORTSMOUTH, NH 03801
CIVIL ENGINEER:	Tighe&Bond 177 CORPORATE DRIVE PORTSMOUTH, NEW HAMPSHIRE 03801
SURVEYOR:	DOUCET SURVEY, INC. 102 KENT PLACE NEWMARKET, NEW HAMPSHIRE 03857
WETLAND SCIENTIST:	GOVE ENVIRONMENTAL SERVICES, INC. 8 CONTINENTAL DRIVE, UNIT H EXETER, NEW HAMPSHIRE 03833

LIST OF PERMITS		
LOCAL	STATUS	DATE
SITE PLAN REVIEW PERMIT	APPROVED	1/17/2019
AMENDED SITE PLAN REVIEW PERMIT	APPROVED	11/16/2023
AMENDED SITE PLAN REVIEW PERMIT - SOLAR		
STATE		
NHDES - ALTERATION OF TERRAIN PERMIT	ISSUED: AOT-1498	10/02/2018
NHDES - WETLANDS PERMIT	ISSUED: #2018-01731	12/21/2018
FEDERAL		
EPA - NPDES CGP (SWPPP)	ACTIVE: NHR1001SK	7/7/2023

STATE OF NEW HAMPSHIRE – NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER
05/20/2024

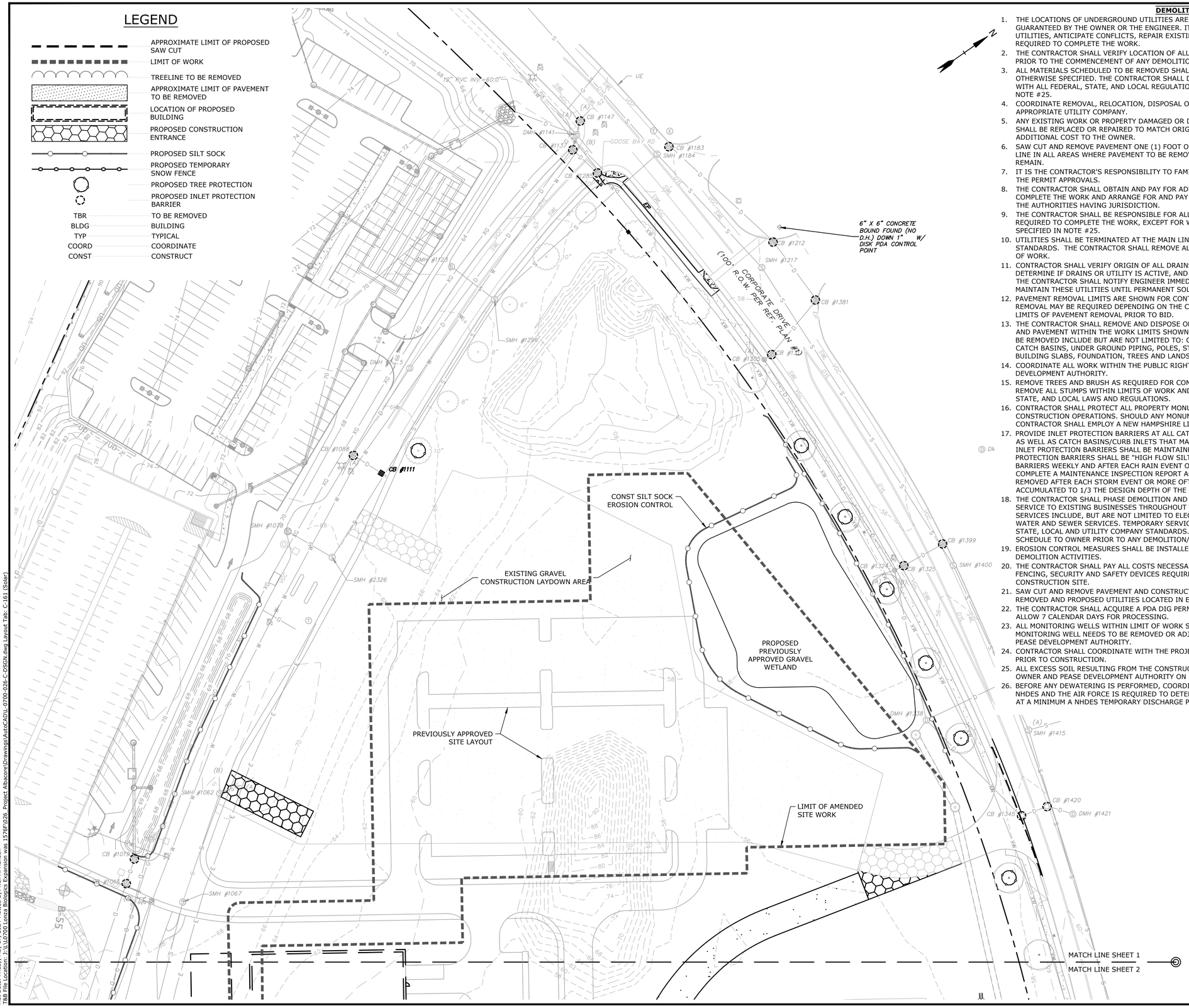
STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER
5/20/24

ISSUED FOR AMENDED SITE REVIEW
COMPLETE SET 11 SHEETS

LEGEND

- APPROXIMATE LIMIT OF PROPOSED SAW CUT
- LIMIT OF WORK
- TREELINE TO BE REMOVED
- APPROXIMATE LIMIT OF PAVEMENT TO BE REMOVED
- LOCATION OF PROPOSED BUILDING
- PROPOSED CONSTRUCTION ENTRANCE
- PROPOSED SILT SOCK
- PROPOSED TEMPORARY SNOW FENCE
- PROPOSED TREE PROTECTION
- PROPOSED INLET PROTECTION BARRIER

TBR	TO BE REMOVED
BLDG	BUILDING
TYP	TYPICAL
COORD	COORDINATE
CONST	CONSTRUCT



DEMOLITION NOTES:

1. THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.
2. THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES. CALL DIG SAFE AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITIES.
3. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES AND CODES EXCEPT AS SPECIFIED IN NOTE #25.
4. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
5. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/ DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
6. SAW CUT AND REMOVE PAVEMENT ONE (1) FOOT OFF PROPOSED EDGE OF PAVEMENT OR EXISTING CURB LINE IN ALL AREAS WHERE PAVEMENT TO BE REMOVED ABUTS EXISTING PAVEMENT OR CONCRETE TO REMAIN.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.
8. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ADDITIONAL PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK AND ARRANGE FOR AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS AND AS SPECIFIED IN NOTE #25.
10. UTILITIES SHALL BE TERMINATED AT THE MAIN LINE PER UTILITY COMPANY AND THE CITY OF PORTSMOUTH STANDARDS. THE CONTRACTOR SHALL REMOVE ALL ABANDONED UTILITIES LOCATED WITHIN THE LIMITS OF WORK.
11. CONTRACTOR SHALL VERIFY ORIGIN OF ALL DRAINS AND UTILITIES PRIOR TO REMOVAL/TERMINATION TO DETERMINE IF DRAINS OR UTILITY IS ACTIVE, AND SERVICES ANY ON OR OFF-SITE STRUCTURE TO REMAIN. THE CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY SUCH UTILITY FOUND AND SHALL MAINTAIN THESE UTILITIES UNTIL PERMANENT SOLUTION IS IN PLACE.
12. PAVEMENT REMOVAL LIMITS ARE SHOWN FOR CONTRACTOR'S CONVENIENCE. ADDITIONAL PAVEMENT REMOVAL MAY BE REQUIRED DEPENDING ON THE CONTRACTOR'S OPERATION. CONTRACTOR TO VERIFY FULL LIMITS OF PAVEMENT REMOVAL PRIOR TO BID.
13. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, CONCRETE PADS, UTILITIES AND PAVEMENT WITHIN THE WORK LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ITEMS TO BE REMOVED INCLUDE BUT ARE NOT LIMITED TO: CONCRETE, PAVEMENT, CURBS, LIGHTING, MANHOLES, CATCH BASINS, UNDER GROUND PIPING, POLES, STAIRS, SIGNS, FENCES, RAMPS, WALLS, BOLLARDS, BUILDING SLABS, FOUNDATION, TREES AND LANDSCAPING.
14. COORDINATE ALL WORK WITHIN THE PUBLIC RIGHT OF WAYS WITH THE CITY OF PORTSMOUTH AND PEASE DEVELOPMENT AUTHORITY.
15. REMOVE TREES AND BRUSH AS REQUIRED FOR COMPLETION OF WORK. CONTRACTOR SHALL GRUB AND REMOVE ALL STUMPS WITHIN LIMITS OF WORK AND DISPOSE OF OFF SITE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.
16. CONTRACTOR SHALL PROTECT ALL PROPERTY MONUMENTATION THROUGHOUT DEMOLITION AND CONSTRUCTION OPERATIONS. SHOULD ANY MONUMENTATION BE DISTURBED BY BY THE CONTRACTOR, THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED SURVEYOR TO REPLACE DISTURBED MONUMENTS.
17. PROVIDE INLET PROTECTION BARRIERS AT ALL CATCH BASINS/CURB INLETS WITHIN CONSTRUCTION LIMITS AS WELL AS CATCH BASINS/CURB INLETS THAT MAY RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. INLET PROTECTION BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT. INLET PROTECTION BARRIERS SHALL BE "HIGH FLOW SILT SACK" BY ACF ENVIRONMENTAL OR EQUAL. INSPECT BARRIERS WEEKLY AND AFTER EACH RAIN EVENT OF 0.25 INCHES OR GREATER. CONTRACTOR SHALL COMPLETE A MAINTENANCE INSPECTION REPORT AFTER EACH INSPECTION. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT OR MORE OFTEN IF THE FABRIC BECOMES CLOGGED OR SEDIMENT HAS ACCUMULATED TO 1/3 THE DESIGN DEPTH OF THE BARRIER.
18. THE CONTRACTOR SHALL PHASE DEMOLITION AND CONSTRUCTION AS REQUIRED TO PROVIDE CONTINUOUS SERVICE TO EXISTING BUSINESSES THROUGHOUT THE CONSTRUCTION PERIOD. EXISTING BUSINESS SERVICES INCLUDE, BUT ARE NOT LIMITED TO ELECTRICAL, COMMUNICATION, FIRE PROTECTION, DOMESTIC WATER AND SEWER SERVICES. TEMPORARY SERVICES, IF REQUIRED, SHALL COMPLY WITH ALL FEDERAL, STATE, LOCAL AND UTILITY COMPANY STANDARDS. CONTRACTOR SHALL PROVIDE DETAILED CONSTRUCTION SCHEDULE TO OWNER PRIOR TO ANY DEMOLITION/CONSTRUCTION ACTIVITIES.
19. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY CLEARING OR DEMOLITION ACTIVITIES.
20. THE CONTRACTOR SHALL PAY ALL COSTS NECESSARY FOR TEMPORARY PARTITIONING, BARRICADING, FENCING, SECURITY AND SAFETY DEVICES REQUIRED FOR THE MAINTENANCE OF A CLEAN AND SAFE CONSTRUCTION SITE.
21. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL UTILITIES TO BE REMOVED AND PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
22. THE CONTRACTOR SHALL ACQUIRE A PDA DIG PERMIT BEFORE ANY EARTH DISTURBANCE CAN TAKE PLACE. ALLOW 7 CALENDAR DAYS FOR PROCESSING.
23. ALL MONITORING WELLS WITHIN LIMIT OF WORK SHALL BE PROTECTED DURING CONSTRUCTION. IF ANY MONITORING WELL NEEDS TO BE REMOVED OR ADJUSTED THIS WORK SHALL BE COORDINATED WITH THE PEASE DEVELOPMENT AUTHORITY.
24. CONTRACTOR SHALL COORDINATE WITH THE PROJECT SURVEYOR FOR BENCHMARK AND CONTROL POINTS PRIOR TO CONSTRUCTION.
25. ALL EXCESS SOIL RESULTING FROM THE CONSTRUCTION SHALL REMAIN ON SITE. COORDINATE WITH OWNER AND PEASE DEVELOPMENT AUTHORITY ON FINAL LOCATION OF EXCESS MATERIALS.
26. BEFORE ANY DEWATERING IS PERFORMED, COORDINATION BETWEEN THE OWNER, CONTRACTOR, PDA, NHDES AND THE AIR FORCE IS REQUIRED TO DETERMINE PROPER PROCEDURES AND PERMITTING REQUIRED. AT A MINIMUM A NHDES TEMPORARY DISCHARGE PERMIT IS REQUIRED.

Tighe&Bond

STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER
5/20/24

STATE OF NEW HAMPSHIRE – NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER
05/20/2024

SCALE IN FEET
0 40' 80'
GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid

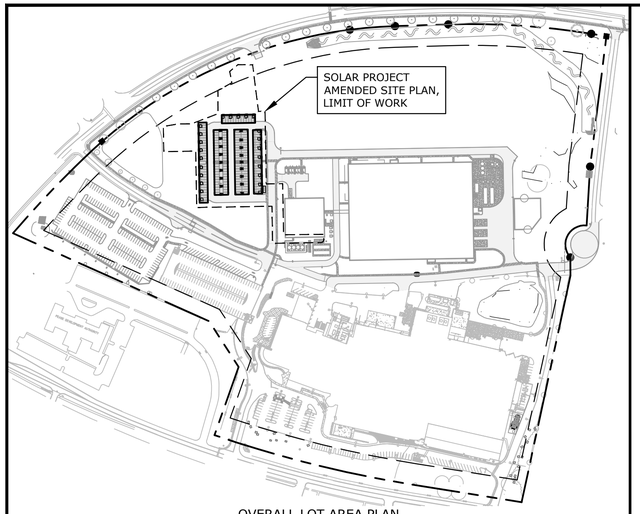
PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PHASE 2
DEMOLITION PLAN

SCALE: AS SHOWN

C-161

Last Save Date: May 17, 2024 3:51 PM By: NAHANSEN
Plot Date: May 17, 2024 3:52 PM By: Nathan A. Hansen
T&B File Location: J:\LL\L0700 Lonza Biologics Expansion was 1576F\026 Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-161 (Solar)



OVERALL LOT AREA PLAN
SCALE : 1" = 250'

SITE DATA

LOCATION: TAX MAP 305, LOTS 1 & 2 — 70 & 80 CORPORATE DRIVE, PORTSMOUTH, NH; TAX MAP 305, LOT 6 — 101 INTERNATIONAL DRIVE, PORTSMOUTH, NH

ZONING DISTRICT: AIRPORT, BUSINESS & COMMERCIAL (ABC)

DIMENSIONAL REQUIREMENTS:

	REQUIRED	PROVIDED
MINIMUM LOT AREA:	5 AC	43.4± AC
MINIMUM STREET FRONTAGE:	200 FT	1,038 FT
MINIMUM FRONT YARD SETBACK:	70 FT	70 FT
SIDE SETBACK	30 FT	30 FT
REAR SETBACK	50 FT	51 FT
MINIMUM OPEN SPACE	25 %	59.9± %

MAXIMUM STRUCTURE HEIGHT SHALL NOT EXCEED FAA CRITERIA.

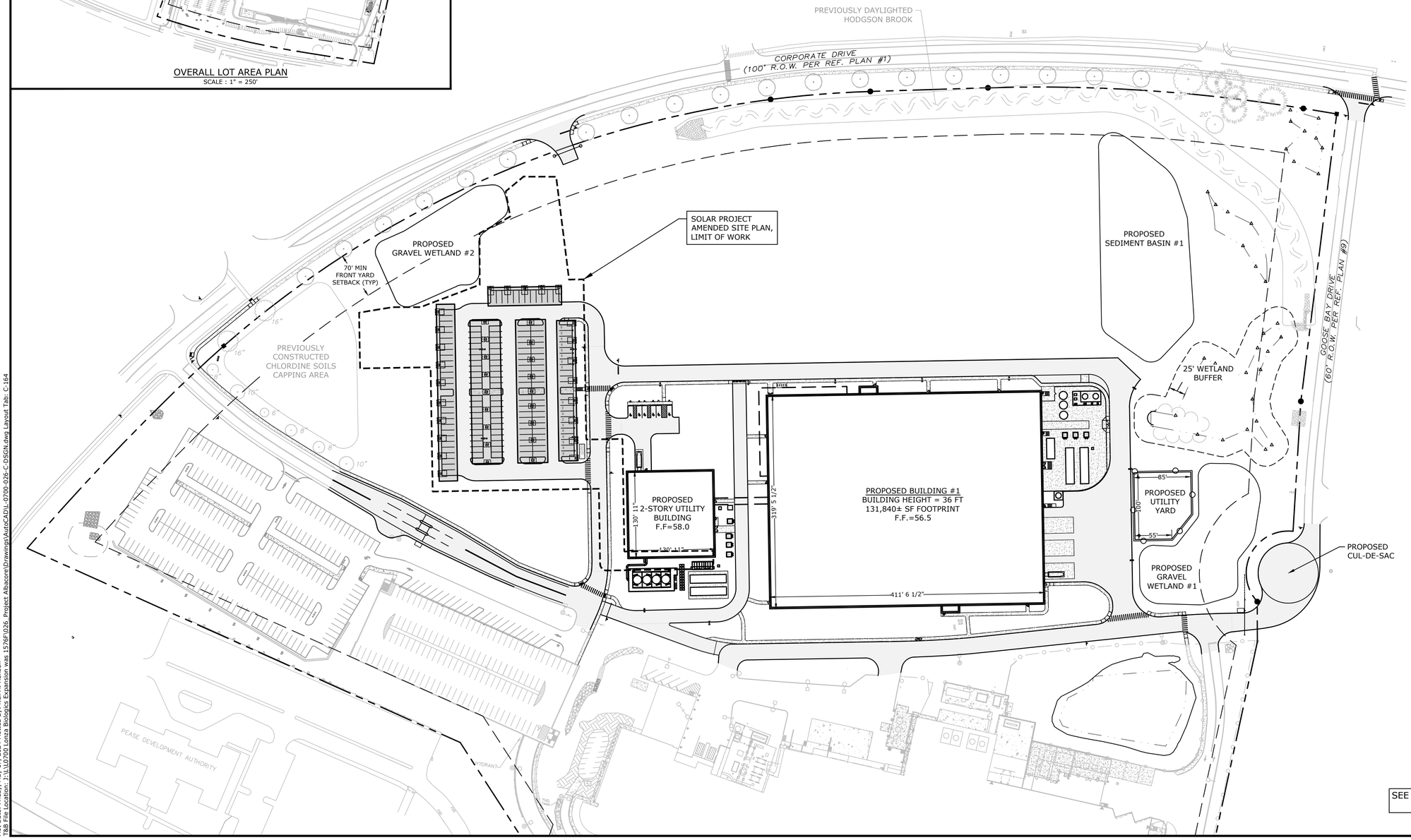
PARKING REQUIREMENTS:

REQUIRED PARKING
2 SPACES PER 3 EMPLOYEES ON LARGEST SHIFT

990 EXISTING EMPLOYEES	660 SPACES
180 ANTICIPATED EMPLOYEES	120 SPACES
TOTAL REQUIRED:	880 SPACES

PARKING PROVIDED

EXISTING SPACES:	801 SPACES
PROPOSED SURFACE PARKING:	156 SPACES
TOTAL:	957 SPACES



SEE SHEET C-165 FOR LEGEND AND SITE NOTES

Tighe&Bond

STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER – 5/20/24

STATE OF NEW HAMPSHIRE – NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER – 05/20/2024

SCALE IN FEET
0 80' 160'
GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
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M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid

PROJECT NO:	L-0700-013
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FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PHASE 2 OVERALL SITE PLAN

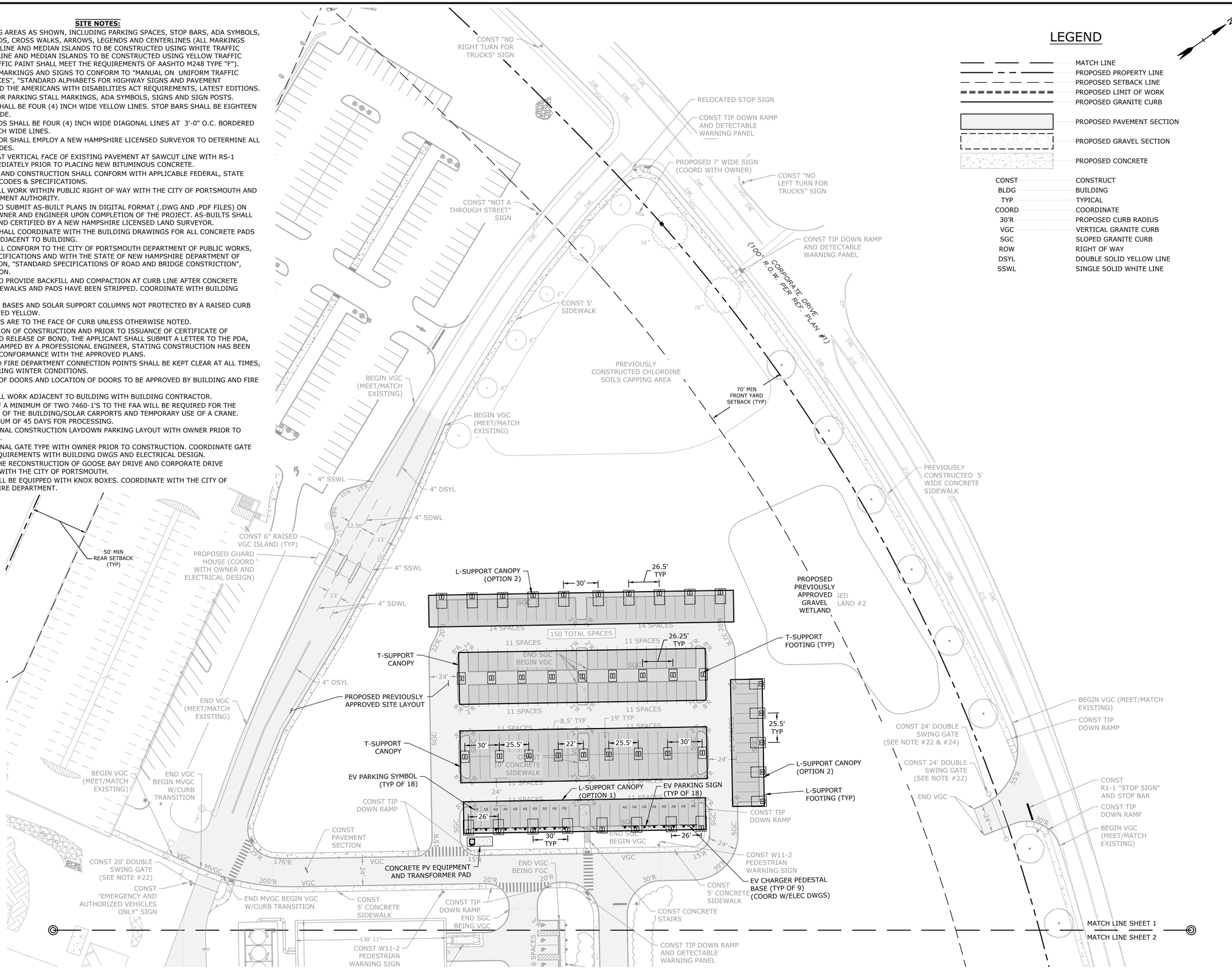
SCALE: AS SHOWN

C-164

Last Save Date: May 17, 2024 3:51 PM By: NAHANSEN
Plot Date: May 17, 2024 Plotted By: Neil A. Hansen
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576F\026. Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-164

SITE NOTES:

1. STRIPE PARKING AREAS AS SHOWN, INCLUDING PARKING SPACES, STOP BARS, ADA SYMBOLS, PAINTED ISLANDS, CROSS WALKS, ARROWS, LEGENDS AND CENTERLINES (ALL MARKINGS EXCEPT CENTERLINE AND MEDIAN ISLANDS TO BE CONSTRUCTED USING WHITE TRAFFIC PAINT. CENTERLINE AND MEDIAN ISLANDS TO BE CONSTRUCTED USING YELLOW TRAFFIC PAINT. ALL TRAFFIC PAINT SHALL MEET THE REQUIREMENTS OF AASHTO M248 TYPE "F").
2. ALL PAVEMENT MARKINGS AND SIGNS TO CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", AND THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS, LATEST EDITIONS.
3. SEE DETAILS FOR PARKING STALL MARKINGS, ADA SYMBOLS, SIGNS AND SIGN POSTS.
4. CENTERLINES SHALL BE FOUR (4) INCH WIDE YELLOW LINES. STOP BARS SHALL BE EIGHTEEN (18) INCHES WIDE.
5. PAINTED ISLANDS SHALL BE FOUR (4) INCH WIDE DIAGONAL LINES AT 3'-0" O.C. BORDERED BY FOUR (4) INCH WIDE LINES.
6. THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED SURVEYOR TO DETERMINE ALL LINES AND GRADES.
7. CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAWCUT LINE WITH RS-1 EMULSION IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
8. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE AND/OR TOWN CODES & SPECIFICATIONS.
9. COORDINATE ALL WORK WITHIN PUBLIC RIGHT OF WAY WITH THE CITY OF PORTSMOUTH AND PEASE DEVELOPMENT AUTHORITY.
10. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
11. CONTRACTOR SHALL COORDINATE WITH THE BUILDING DRAWINGS FOR ALL CONCRETE PADS & SIDEWALKS ADJACENT TO BUILDING.
12. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRICTION", CURRENT EDITION.
13. CONTRACTOR TO PROVIDE BACKFILL AND COMPACTION AT CURB LINE AFTER CONCRETE FORMS FOR SIDEWALKS AND PADS HAVE BEEN STRIPPED. COORDINATE WITH BUILDING CONTRACTOR.
14. ALL LIGHT POLE BASES AND SOLAR SUPPORT COLUMNS NOT PROTECTED BY A RAISED CURB SHALL BE PAINTED YELLOW.
15. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
16. UPON COMPLETION OF CONSTRUCTION AND PRIOR TO ISSUANCE OF CERTIFICATE OF OCCUPANCY AND RELEASE OF BOND, THE APPLICANT SHALL SUBMIT A LETTER TO THE PDA, SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, STATING CONSTRUCTION HAS BEEN COMPLETED IN CONFORMANCE WITH THE APPROVED PLANS.
17. FIRE LANES AND FIRE DEPARTMENT CONNECTION POINTS SHALL BE KEPT CLEAR AT ALL TIMES, INCLUDING DURING WINTER CONDITIONS.
18. FINAL NUMBER OF DOORS AND LOCATION OF DOORS TO BE APPROVED BY BUILDING AND FIRE DEPARTMENTS.
19. COORDINATE ALL WORK ADJACENT TO BUILDING WITH BUILDING CONTRACTOR.
20. SUBMISSION OF A MINIMUM OF TWO 7460-1'S TO THE FAA WILL BE REQUIRED FOR THE CONSTRUCTION OF THE BUILDING/SOLAR CARPORTS AND TEMPORARY USE OF A CRANE. ALLOW A MINIMUM OF 45 DAYS FOR PROCESSING.
21. COORDINATE FINAL CONSTRUCTION LAYDOWN PARKING LAYOUT WITH OWNER PRIOR TO CONSTRUCTION.
22. COORDINATE FINAL GATE TYPE WITH OWNER PRIOR TO CONSTRUCTION. COORDINATE GATE ELECTRICAL REQUIREMENTS WITH BUILDING DWGS AND ELECTRICAL DESIGN.
23. COORDINATE THE RECONSTRUCTION OF GOOSE BAY DRIVE AND CORPORATE DRIVE INTERSECTION WITH THE CITY OF PORTSMOUTH.
24. ALL GATES SHALL BE EQUIPPED WITH KNOX BOXES. COORDINATE WITH THE CITY OF PORTSMOUTH FIRE DEPARTMENT.



LEGEND

- MATCH LINE
- PROPOSED PROPERTY LINE
- PROPOSED SETBACK LINE
- PROPOSED LIMIT OF WORK
- PROPOSED GRANITE CURB
- PROPOSED PAVEMENT SECTION
- PROPOSED GRAVEL SECTION
- PROPOSED CONCRETE

CONST	CONSTRUCT
BLDG	BUILDING
TYP	TYPICAL
COORD	COORDINATE
30'R	PROPOSED CURB RADIUS
VGC	VERTICAL GRANITE CURB
SGC	SLOPED GRANITE CURB
ROW	RIGHT OF WAY
DSYL	DOUBLE SOLID YELLOW LINE
SSWL	SINGLE SOLID WHITE LINE

Tighe&Bond

STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER
5/20/24

STATE OF NEW HAMPSHIRE – NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER
05/20/2024

SCALE IN FEET
0 40' 80'
GRAPHIC SCALE

Proposed Industrial Development

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DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PHASE 2
SITE PLAN

SCALE: AS SHOWN

C-165

Last Save Date: May 17, 2024 3:51 PM By: NAHANSEN
Plot Date: May 17, 2024 3:51 PM By: Neil A. Hansen
T&B File Location: J:\LU\0700 Lonza Biologics Expansion was 1576F\026. Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-165

PCB100
RIM=49.50
INV.IN=43.95 NE
INV.OUT=43.85 SW

PCB101
RIM=50.30
INV.OUT=45.70 W

PCB102
RIM=51.20
INV.OUT=47.50 SW

PCB103
RIM=54.00
INV.IN=49.70 NE
INV.IN=49.00 NW
INV.OUT=48.90 SE

PCB104
RIM=54.00
INV.OUT=49.80 SW

PCB105
RIM=57.00
INV.IN=50.95 NE
INV.IN=50.95 NW
INV.OUT=50.85 SE

PCB106
RIM=57.00
INV.OUT=51.05 SW

PCB107
RIM=56.00
INV.IN=51.80 NE
INV.IN=51.80 NW
INV.IN=51.80 SW
INV.OUT=51.70 SE

PCB108
RIM=56.00
INV.OUT=51.95 SW

PCB109
RIM=56.00
INV.OUT=52.00 SE

PCB110
RIM=49.40
INV.IN=44.50 W
INV.OUT=44.40 E

PCB111
RIM=56.80
INV.OUT=52.65 SE

PCB112
RIM=49.30
INV.IN=43.25 SW
INV.OUT=43.15 NE

PCB113
RIM=42.85
INV.OUT=38.20 S

PCB114
RIM=51.10
INV.IN=46.00 NW
INV.IN=47.00 NE
INV.OUT=45.90 SE

PCB200
RIM=58.00
INV.IN=51.40 SW
INV.IN=51.40 NW
INV.OUT=51.30 NE

PCB201
RIM=57.50
INV.OUT=51.55 SE

PCB202
RIM=59.85
INV.IN=52.00 NW
INV.OUT=51.90 NE

PCB203
RIM=59.25
INV.OUT=52.40 SE

PCB204
RIM=66.75
INV.OUT=61.65 W

PCB205
RIM=53.60
INV.IN=46.55 SW
INV.OUT=46.45 NE

PCB206
RIM=53.60
INV.OUT=46.65 NE

PCB207
RIM=49.30
INV.OUT=43.35 NE

PDMH100
RIM=49.00
INV.IN=44.00 W
INV.IN=43.20 NE
INV.OUT=43.20 SE

PDMH101
RIM=50.65
INV.IN=45.50 NW
INV.IN=45.50 E
INV.OUT=45.40 SW

PDMH103
RIM=54.95
INV.IN=47.00 NW
INV.IN=49.20 SW
INV.OUT=46.90 SE

PDMH104
RIM=55.80
INV.IN=49.95 NW
INV.IN=51.60 SW
INV.OUT=49.85 SE

PDMH105
RIM=54.85
INV.IN=49.40 NW
INV.IN=50.65 SW
INV.OUT=49.30 SE

PDMH106
RIM=53.70
INV.IN=46.20 NW
INV.IN=46.30 SW
INV.IN=49.35 NE
INV.OUT=46.10 SE

PDMH109
RIM=61.50
INV.IN=48.35 NW
INV.IN=51.25 NE
INV.OUT=48.25 SE

PDMH110
RIM=61.75
INV.IN=48.70 NW
INV.IN=48.70 NE
INV.OUT=48.60 SE

PDMH111
RIM=56.15
INV.IN=50.05 NE
INV.IN=53.70 SE
INV.IN=51.50 E
INV.OUT=49.95 SW

PDMH112
RIM=55.90
INV.IN=49.75 NE
INV.IN=51.85 NW
INV.OUT=49.65 SW

PDMH113
RIM=63.00
INV.IN=55.00 N
INV.IN=52.95 SW
INV.OUT=51.30 SE

PDMH114
RIM=52.80
INV.IN=46.50 NW
INV.OUT=46.40 SE

PDMH115
RIM=59.50
INV.IN=52.55 SW
INV.IN=52.55 SE
INV.OUT=52.45 NE

PDMH116
RIM=56.40
INV.IN=47.05 NW
INV.IN=53.00 NE
INV.IN=49.25 N
INV.IN=51.10 NE
INV.OUT=46.95 SE

PDMH200
RIM=59.10
INV.IN=50.85 SW
INV.OUT=50.75 NW

POS101
RIM=47.00
INV.OUT=41.35 E

POS102
RIM=46.80
INV.OUT=42.75 S

POS200
RIM=56.50
INV.OUT=49.85 E

PYD100
RIM=56.00
INV.IN=52.00 NW
INV.IN=50.35 NE
INV.OUT=50.25 SW

PYD101
RIM=55.00
INV.IN=49.30 NE
INV.IN=50.00 NW
INV.OUT=49.20 SW

PYD102
RIM=55.50
INV.IN=47.70 NW
INV.OUT=47.60 SE

PYD103
RIM=51.25
INV.IN=45.65 NW
INV.OUT=45.55 E

PYD104
RIM=59.00
INV.OUT=52.65 NE

PYD201
RIM=62.00
INV.IN=55.50 NW
INV.OUT=55.40 S

PYD202
RIM=61.50
INV.OUT=56.50 SE

PYD203
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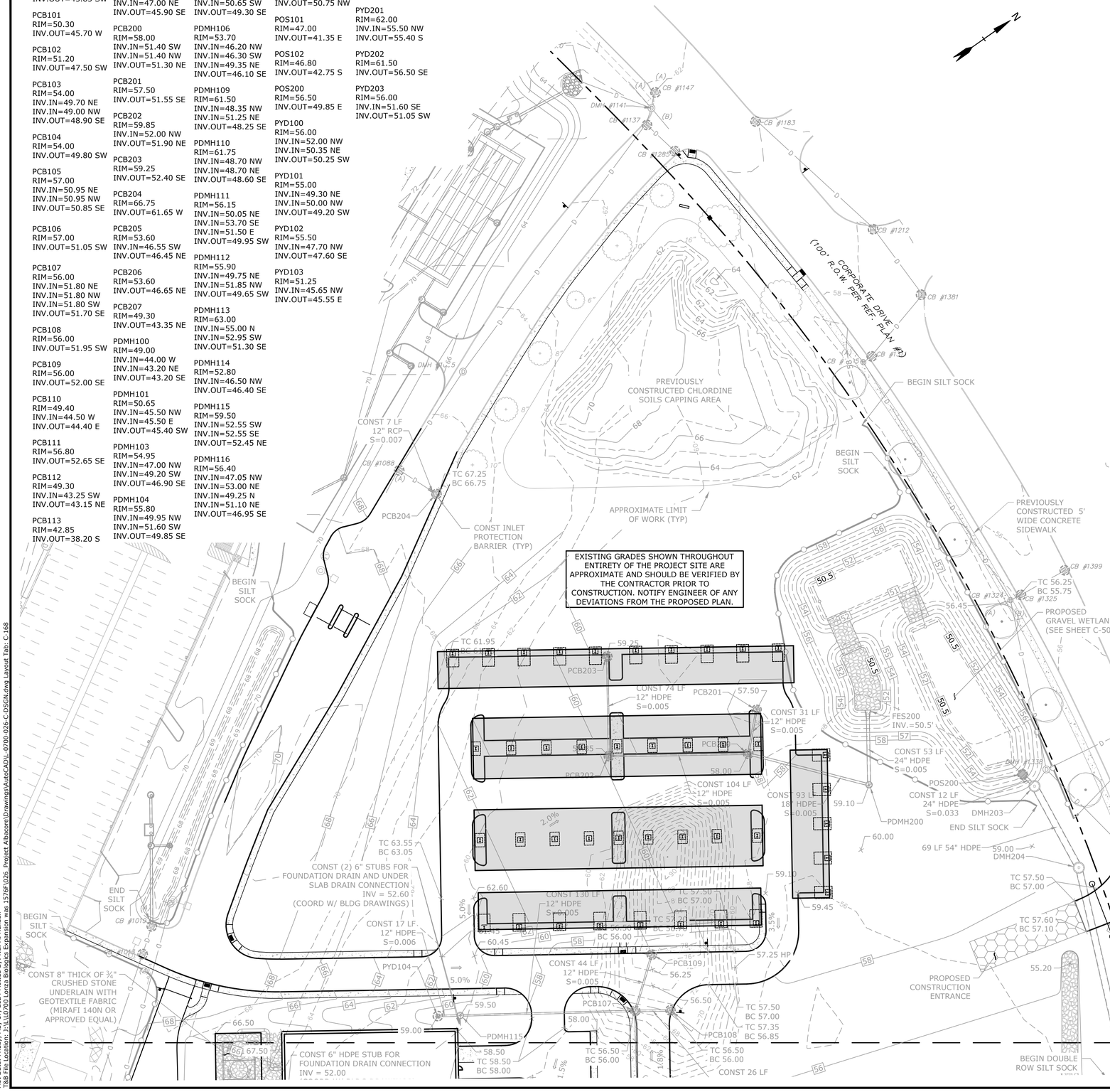


GRADING AND DRAINAGE NOTES:

1. COMPACTION REQUIREMENTS:

BELOW PAVED OR CONCRETE AREAS	95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL	95%
BELOW LOAM AND SEED AREAS	90%

* ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH ASTM D-1557, METHOD C FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH ASTM D-1556 OR ASTM-2922.

2. ALL STORM DRAINAGE PIPES SHALL BE HIGH DENSITY POLYETHYLENE (HANCOR HI-Q, ADS N-12 OR APPROVED EQUAL), UNLESS OTHERWISE SPECIFIED.
3. SEE UTILITIES PLAN FOR ALL SITE UTILITY INFORMATION.
4. ADJUST ALL MANHOLES, CATCHBASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
5. CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE AND LAWN AREAS FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCES, EXITS, RAMPS AND LOADING DOCK AREAS ADJACENT TO THE BUILDING.
6. CONTRACTOR SHALL THOROUGHLY CLEAN ALL CATCHBASINS AND DRAIN LINES, WITHIN THE LIMIT OF WORK, OF SEDIMENT IMMEDIATELY UPON COMPLETION OF CONSTRUCTION.
7. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE AND LOCAL CODES.
8. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED FERTILIZER AND MULCH.
9. ALL STORM DRAIN CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NHDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST EDITION.
10. ALL PROPOSED CATCHBASINS SHALL BE EQUIPPED WITH OIL/GAS SEPARATOR HOODS AND 4' SUMPS.
11. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
12. CONTRACTOR SHALL COORDINATE WITH THE PROJECT SURVEYOR FOR BENCHMARK AND CONTROL POINTS PRIOR TO CONSTRUCTION.
13. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS, AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION.
14. PER COORDINATION WITH THE PDA, GROUNDWATER DISCHARGE FROM THE PROPOSED FOUNDATION DRAIN AND UNDER-SLAB DRAIN OF BUILDING 1 AND THE CENTRAL UTILITY BUILDING WILL BE CONNECTED TO THE ONSITE DRAINAGE SYSTEM. IF TREATMENT OF THE GROUNDWATER DISCHARGE IS DETERMINED TO BE REQUIRED DURING THE BUILDING PERMITTING PROCESS AND RE-INFILTRATION IS NOT PERMITTED, A CARBON FILTRATION SYSTEM WILL BE NEEDED.

EROSION CONTROL NOTES:

1. INSTALL EROSION CONTROL BARRIERS AS SHOWN AS FIRST ORDER OF WORK.
2. SEE GENERAL EROSION CONTROL NOTES ON DETAIL SHEETS.
3. PROVIDE INLET PROTECTION AROUND ALL EXISTING AND PROPOSED CATCHBASIN INLETS WITHIN THE WORK LIMITS. MAINTAIN FOR THE DURATION OF THE PROJECT UNTIL PAVEMENT HAS BEEN INSTALLED.
4. INSTALL STABILIZED CONSTRUCTION ENTRANCES.
5. INSPECT INLET PROTECTION AND SILT FENCES DAILY AND AFTER EACH RAIN STORM OF 0.25 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
6. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED, FERTILIZER AND MULCH.
7. CONSTRUCT EXCELSIOR MAT ON ALL SLOPES STEEPER THAN 3:1.
8. PRIOR TO ANY WORK OR SOIL DISTURBANCE COMMENCING ON THE SUBJECT PROPERTY, INCLUDING MOVING OF EARTH, THE APPLICANT SHALL INSTALL ALL EROSION AND SILTATION MITIGATION AND CONTROL MEASURES AS REQUIRED BY STATE AND LOCAL PERMITS AND APPROVALS.
9. CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST AND WIND EROSION THROUGHOUT THE CONSTRUCTION PERIOD. DUST CONTROL MEASURES SHALL INCLUDE, BUT NOT LIMITED TO, SPRINKLING WATER ON UNSTABLE SOILS SUBJECT TO ARID CONDITIONS.
10. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION AND FINAL STABALIZATION.
11. ALL CATCHBASIN SUMPS AND PIPING SHALL BE THOROUGHLY CLEANED TO REMOVE ALL SEDIMENT AND DEBRIS AFTER THE PROJECT HAS BEEN PAVED.
12. TEMPORARY SOIL STOCKPILE SHALL BE SURROUNDED BY SILT FENCE AND SHALL BE STABILIZED BY TEMPORARY EROSION CONTROL SEEDING. STOCKPILE AREAS TO BE LOCATED AS FAR AS POSSIBLE FROM THE DELINEATED EDGE OF WETLAND.
13. SAFETY FENCING SHALL BE PROVIDED AROUND STOCKPILES OVER 10 FT.
14. CONCRETE TRUCKS WILL BE REQUIRED TO WASH OUT (IF NECESSARY) SHOOTS ONLY WITHIN AREAS WHERE CONCRETE HAS BEEN PLACED. NO OTHER WASH OUT WILL BE ALLOWED.

LEGEND

- MATCH LINE
- PROPOSED PROPERTY LINE
- 56 PROPOSED CONTOUR LINE
- PROPOSED DRAIN LINE (TYP)
- PROPOSED SILT SOCK
- INLET PROTECTION SILT SACK
- PROPOSED CATCHBASIN
- PROPOSED DOUBLE GRATE CATCHBASIN
- PROPOSED DRAIN MANHOLE

CONST	CONSTRUCT
BLDG	BUILDING
TYP	TYPICAL
COORD	COORDINATE
RD	ROOF DRAIN
VIF	VERIFY IN FIELD
TC	TOP OF CURB
BC	BOTTOM OF CURB

Tighe&Bond

STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER – PATRICK CRIMMINS No. 12378 LICENSED
5/20/24

STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER – NEIL A. HANSEN No. 15227 LICENSED
05/20/2024

SCALE IN FEET
0 40' 80'
GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid

PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PHASE 2 GRADING, DRAINAGE & EROSION CONTROL PLAN

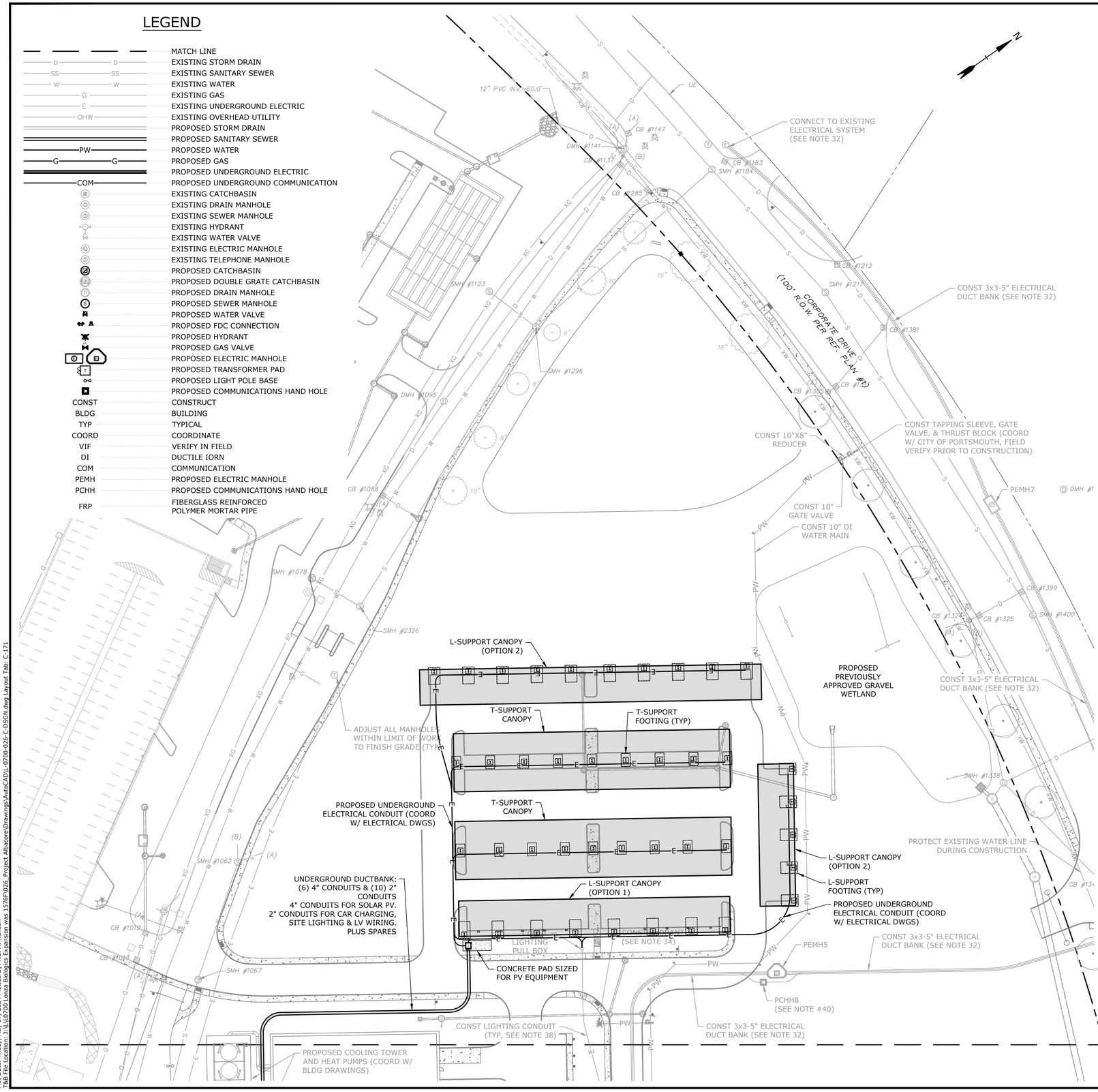
SCALE: AS SHOWN

C-168

Last Save Date: May 17, 2024 3:51 PM By: NAHANSEN
Plot Date: May 17, 2024 3:52 PM By: Neil A. Hansen
T&B File Location: J:\LL\L0700 Lonza Biologics Expansion was 1576F\026. Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-168

LEGEND

	MATCH LINE
D	EXISTING STORM DRAIN
SS	EXISTING SANITARY SEWER
W	EXISTING WATER
G	EXISTING GAS
E	EXISTING UNDERGROUND ELECTRIC
OHW	EXISTING OVERHEAD UTILITY
	PROPOSED STORM DRAIN
	PROPOSED SANITARY SEWER
PW	PROPOSED WATER
G	PROPOSED GAS
	PROPOSED UNDERGROUND ELECTRIC
COM	PROPOSED UNDERGROUND COMMUNICATION
	EXISTING CATCHBASIN
	EXISTING DRAIN MANHOLE
	EXISTING SEWER MANHOLE
	EXISTING HYDRANT
	EXISTING WATER VALVE
	EXISTING ELECTRIC MANHOLE
	EXISTING TELEPHONE MANHOLE
	PROPOSED CATCHBASIN
	PROPOSED DOUBLE GRATE CATCHBASIN
	PROPOSED DRAIN MANHOLE
S	PROPOSED SEWER MANHOLE
	PROPOSED WATER VALVE
	PROPOSED FDC CONNECTION
	PROPOSED HYDRANT
	PROPOSED GAS VALVE
	PROPOSED ELECTRIC MANHOLE
T	PROPOSED TRANSFORMER PAD
	PROPOSED LIGHT POLE BASE
	PROPOSED COMMUNICATIONS HAND HOLE
CONST	CONSTRUCT
BLDG	BUILDING
TYP	TYPICAL
COORD	COORDINATE
VIF	VERIFY IN FIELD
DI	DUCTILE IORN
COM	COMMUNICATION
PEMH	PROPOSED ELECTRIC MANHOLE
PCHH	PROPOSED COMMUNICATIONS HAND HOLE
FRP	FIBERGLASS REINFORCED POLYMER MORTAR PIPE



UTILITY NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES, AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK AT NO ADDITIONAL COST TO THE OWNER.
2. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.
   NATURAL GAS - UNITIL
   WATER - CITY OF PORTSMOUTH DPW
   SEWER - CITY OF PORTSMOUTH DPW
   ELECTRIC - EVERSOURCE
   COMMUNICATIONS - FAIRPOINT, COMCAST, FIRSTLIGHT
3. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION.
4. SEE GRADING, DRAINAGE & EROSION CONTROL PLAN FOR PROPOSED GRADING AND EROSION CONTROL MEASURES.
5. ALL WATER MAIN INSTALLATIONS SHALL BE CLASS 52, CEMENT LINED DUCTILE IRON PIPE.
6. ALL WATER MAIN INSTALLATIONS SHALL BE PRESSURE TESTED AND CHLORINATED AFTER CONSTRUCTION PRIOR TO ACTIVATING THE SYSTEM. CONTRACTOR SHALL COORDINATE CHLORINATION AND TESTING WITH THE CITY OF PORTSMOUTH WATER DEPARTMENT.
7. ALL SEWER PIPE SHALL BE FIBERGLASS REINFORCED POLYMER MORTAR (FRP) PIPE UNLESS OTHERWISE STATED.
8. ALL WORK WITHIN PORTSMOUTH ROWS SHALL BE COORDINATED WITH CITY OF PORTSMOUTH AND THE PEASE DEVELOPMENT AUTHORITY.
9. CONTRACTOR SHALL MAINTAIN UTILITY SERVICES TO ABUTTING PROPERTIES THROUGHOUT CONSTRUCTION.
10. CONNECTIONS TO EXISTING WATER MAIN SHALL BE CONSTRUCTED TO CITY OF PORTSMOUTH STANDARDS.
11. EXISTING UTILITIES TO BE REMOVED SHALL BE CAPPED AT THE MAIN AND MEET THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS STANDARDS FOR CAPPING OF WATER AND SEWER SERVICES.
12. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
13. THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE UTILITY COMPANIES.
14. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
15. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
16. THE CONTRACTOR SHALL OBTAIN, PAY FOR, AND COMPLY WITH ALL REQUIRED PERMITS, ARRANGE FOR ALL INSPECTIONS, AND SUBMIT COPIES OF ACCEPTANCE CERTIFICATES TO THE OWNER PRIOR TO THE COMPLETION OF THIS PROJECT.
17. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
18. CONTRACTOR SHALL PROVIDE EXCAVATION, BEDDING, BACKFILL AND COMPACTION FOR NATURAL GAS SERVICES.
19. A 10-FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18-INCH MINIMUM OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER/SANITARY SEWER CROSSINGS.
20. THE CONTRACTOR SHALL CONTACT "DIG-SAFE" 72 HOURS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL HAVE THE "DIG-SAFE" NUMBER ON SITE AT ALL TIMES.
21. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
22. SAWCUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
23. HYDRANTS, GATE VALVES, FITTINGS, ETC. SHALL MEET THE REQUIREMENTS OF THE CITY OF PORTSMOUTH AND THE PEASE DEVELOPMENT AUTHORITY.
24. COORDINATE TESTING OF SEWER CONSTRUCTION WITH THE CITY OF PORTSMOUTH.
25. ALL SEWER PIPE WITH LESS THAN 6' OF COVER IN PAVED AREAS OR LESS THAN 4' OF COVER IN UNPAVED AREAS SHALL BE INSULATED.
26. CONTRACTOR SHALL COORDINATE ALL ELECTRIC WORK INCLUDING BUT NOT LIMITED TO: CONDUIT CONSTRUCTION, MANHOLE CONSTRUCTION, UTILITY POLE CONSTRUCTION, OVERHEAD WIRE RELOCATION, AND TRANSFORMER CONSTRUCTION WITH POWER COMPANY.
27. CONTRACTOR SHALL PHASE UTILITY CONSTRUCTION, PARTICULARLY WATER MAIN AND GAS MAIN CONSTRUCTION, AS TO MAINTAIN CONTINUOUS SERVICE TO ABUTTING PROPERTIES. CONTRACTOR SHALL COORDINATE TEMPORARY SERVICES TO ABUTTERS WITH THE UTILITY COMPANY AND AFFECTED ABUTTER.
28. SITE LIGHTING SPECIFICATIONS, CONDUIT LAYOUT AND CIRCUITRY FOR PROPOSED SITE LIGHTING AND SIGN ILLUMINATION SHALL BE PROVIDED BY THE PROJECT ELECTRICAL ENGINEER.
29. CONTRACTOR SHALL CONSTRUCT ALL UTILITIES AND DRAINS TO WITHIN 10' OF THE FOUNDATION WALLS AND CONNECT THESE TO SERVICE STUBS FROM THE BUILDING.
30. EXISTING SEWER MAIN AND STRUCTURES IN GOOSE BAY DRIVE ARE BASED ON A PROPOSED DESIGN BY UNDERWOOD ENGINEERS, DATED JULY 28, 2017, AND WAS CONSTRUCTED IN SUMMER 2018. THE PROPOSED ON-SITE SEWER DESIGN ELEVATIONS ARE BASED ON THE UNDERWOOD PLAN DURING CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE SEWER CONSTRUCTION WITH THE CITY OF PORTSMOUTH, AND VERIFY ALL INVERTS PRIOR TO CONSTRUCTION.
31. LOCATION SHOWN IS APPROXIMATE ONLY. FINAL DESIGN OF NATURAL GAS SERVICE TO BE COMPLETED BY UNITIL. WORK IN CORPORATE DRIVE MAY NEED TO BE COMPLETED IN CONJUNCTION WITH FUTURE RECONSTRUCTION OF CORPORATE DRIVE. COORDINATE WITH CITY OF PORTSMOUTH AND UNITIL.
32. LOCATION AND TYPE SHOWN IS APPROXIMATE ONLY. FINAL DESIGN OF ELECTRIC SERVICE AND ASSOCIATED INFRASTRUCTURE TO BE COMPLETED BY EVERSOURCE. WORK IN CORPORATE DRIVE MAY NEED TO BE COMPLETED IN CONJUNCTION WITH FUTURE RECONSTRUCTION OF CORPORATE DRIVE. COORDINATE WITH CITY OF PORTSMOUTH AND EVERSOURCE.
33. FINAL LOCATION OF ALL WATER METER AND VALVES SHALL BE COORDINATED WITH THE CITY OF PORTSMOUTH DPW PRIOR TO CONSTRUCTION.
34. FINAL LOCATION OF FIRE HYDRANTS, FIRE DEPARTMENT CONNECTIONS AND DRY STAND PIPES WILL BE COORDINATED WITH THE BUILDING DRAWINGS AND APPROVED BY THE PORTSMOUTH FIRE DEPARTMENT PRIOR TO CONSTRUCTION.
35. THE APPLICANT SHALL HAVE A SITE SURVEY CONDUCTED BY A RADIO COMMUNICATIONS CARRIER APPROVED BY THE CITY'S COMMUNICATIONS DIVISION. THE RADIO COMMUNICATIONS CARRIER MUST BE FAMILIAR AND CONVERSANT WITH THE POLICE AND RADIO CONFIGURATION. IF THE SITE SURVEY INDICATES IT IS NECESSARY TO INSTALL A SIGNAL REPEATER EITHER ON OR NEAR THE PROPOSED PROJECT, THOSE COSTS SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER. THE OWNER SHALL COORDINATE WITH THE SUPERVISOR OF RADIO COMMUNICATIONS FOR THE CITY.
36. CONTRACTOR SHALL PERFORM TEST PITS TO VERIFY INVERT ELEVATIONS IN FIELD PRIOR TO CONSTRUCTION AND SHALL NOTIFY ENGINEER IF ELEVATION DIFFERS FROM PLAN.
37. CONTRACTOR SHALL DISPOSE OF ASBESTOS CEMENT PIPES IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS SHOULD ANY BE FOUND DURING CONSTRUCTION.
38. COORDINATE LIGHTING CONDUIT QUANTITY AND SIZE REQUIREMENTS WITH ELECTRICAL DESIGNS.
39. ABANDON EXISTING SEWERS, WHERE NOTED ON DRAWINGS ONCE PROPOSED SEWERS HAVE BEEN INSTALLED, TESTED, AND ACCEPTED BY THE CITY. EXISTING SEWERS LESS THAN 24" DIAMETER SHALL BE ABANDONED BY PLACING CONCRETE PLUGS IN THE OPEN ENDS, IN ACCORDANCE WITH SPECIFICATION SECTION 02280.
40. CONTRACTOR SHALL COORDINATE FINAL COMMUNICATIONS HAND HOLD LOCATIONS, CONDUIT SIZE AND QUANTITY WITH COMMUNICATIONS COMPANIES PRIOR TO CONSTRUCTION.

Tighe&Bond

STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER – PATRICK CRIMMINS No. 12378 LICENSED
5/20/24

STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER – NEIL A. HANSEN No. 15227 LICENSED
05/20/2024

SCALE IN FEET
0 40' 80'
GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid

PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

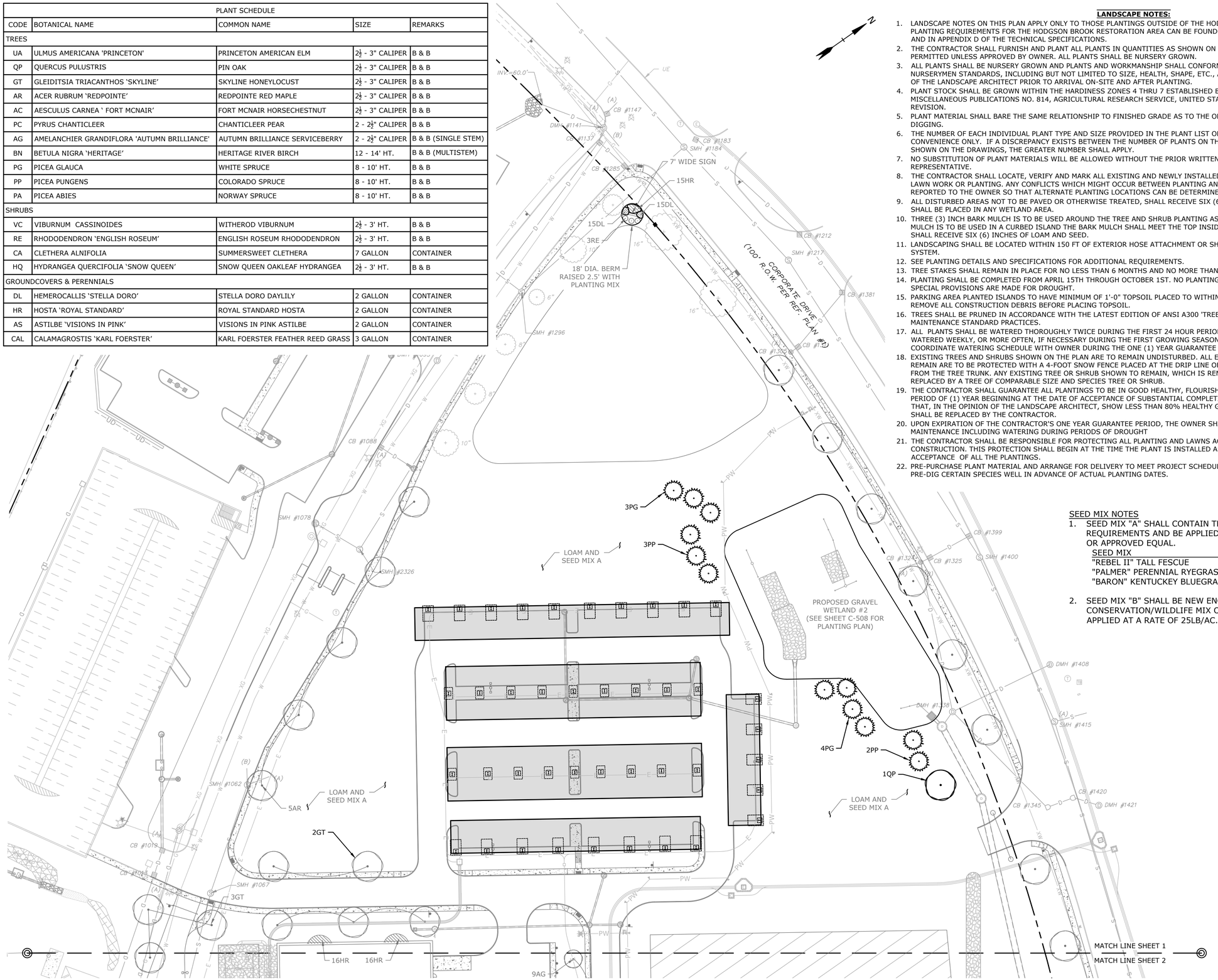
PHASE 2
UTILITIES PLAN

SCALE: AS SHOWN

C-171

Last Save Date: May 17, 2024 3:51 PM By: NAHANSEN
Plot Date: May 17, 2024 3:52 PM By: NAHANSEN
T&B File Location: J:\LL\0700 Lonza Biologics Expansion was 1576F\026_Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-171

PLANT SCHEDULE				
CODE	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
TREES				
UA	ULMUS AMERICANA 'PRINCETON'	PRINCETON AMERICAN ELM	2½ - 3" CALIPER	B & B
QP	QUERCUS PULUSTRIS	PIN OAK	2½ - 3" CALIPER	B & B
GT	GLEIDITSIA TRIACANTHOS 'SKYLINE'	SKYLINE HONEYLOCUST	2½ - 3" CALIPER	B & B
AR	ACER RUBRUM 'REDPOINTE'	REDPOINTE RED MAPLE	2½ - 3" CALIPER	B & B
AC	AESCULUS CARNEA ' FORT MCNAIR'	FORT MCNAIR HORSECHESTNUT	2½ - 3" CALIPER	B & B
PC	PYRUS CHANTICLEER	CHANTICLEER PEAR	2 - 2½" CALIPER	B & B
AG	AMELANCHIER GRANDIFLORA 'AUTUMN BRILLIANCE'	AUTUMN BRILLIANCE SERVICEBERRY	2 - 2½" CALIPER	B & B (SINGLE STEM)
BN	BETULA NIGRA 'HERITAGE'	HERITAGE RIVER BIRCH	12 - 14' HT.	B & B (MULTISTEM)
PG	PICEA GLAUCA	WHITE SPRUCE	8 - 10' HT.	B & B
PP	PICEA PUNGENS	COLORADO SPRUCE	8 - 10' HT.	B & B
PA	PICEA ABIES	NORWAY SPRUCE	8 - 10' HT.	B & B
SHRUBS				
VC	VIBURNUM CASSINOIDES	WITHEROD VIBURNUM	2½ - 3' HT.	B & B
RE	RHODODENDRON 'ENGLISH ROSEUM'	ENGLISH ROSEUM RHODODENDRON	2½ - 3' HT.	B & B
CA	CLETHERA ALNIFOLIA	SUMMERSWEET CLETHERA	7 GALLON	CONTAINER
HQ	HYDRANGEA QUERCIFOLIA 'SNOW QUEEN'	SNOW QUEEN OAKLEAF HYDRANGEA	2½ - 3' HT.	B & B
GROUNDCOVERS & PERENNIALS				
DL	HEMEROCALLIS 'STELLA DORO'	STELLA DORO DAYLILY	2 GALLON	CONTAINER
HR	HOSTA 'ROYAL STANDARD'	ROYAL STANDARD HOSTA	2 GALLON	CONTAINER
AS	ASTILBE 'VISIONS IN PINK'	VISIONS IN PINK ASTILBE	2 GALLON	CONTAINER
CAL	CALAMAGROSTIS 'KARL FOERSTER'	KARL FOERSTER FEATHER REED GRASS	3 GALLON	CONTAINER



LANDSCAPE NOTES:

1. LANDSCAPE NOTES ON THIS PLAN APPLY ONLY TO THOSE PLANTINGS OUTSIDE OF THE HODGSON BROOK RESTORATION AREA. PLANTING REQUIREMENTS FOR THE HODGSON BROOK RESTORATION AREA CAN BE FOUND ON PLAN SHEETS C-701 THROUGH C-714 AND IN APPENDIX D OF THE TECHNICAL SPECIFICATIONS.
2. THE CONTRACTOR SHALL FURNISH AND PLANT ALL PLANTS IN QUANTITIES AS SHOWN ON THIS PLAN. NO SUBSTITUTIONS WILL BE PERMITTED UNLESS APPROVED BY OWNER. ALL PLANTS SHALL BE NURSERY GROWN.
3. ALL PLANTS SHALL BE NURSERY GROWN AND PLANTS AND WORKMANSHIP SHALL CONFORM TO THE AMERICAN ASSOCIATION OF NURSERYMEN STANDARDS, INCLUDING BUT NOT LIMITED TO SIZE, HEALTH, SHAPE, ETC., AND SHALL BE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO ARRIVAL ON-SITE AND AFTER PLANTING.
4. PLANT STOCK SHALL BE GROWN WITHIN THE HARDINESS ZONES 4 THRU 7 ESTABLISHED BY THE PLANT HARDINESS ZONE MAP, MISCELLANEOUS PUBLICATIONS NO. 814, AGRICULTURAL RESEARCH SERVICE, UNITED STATES DEPARTMENT AGRICULTURE, LATEST REVISION.
5. PLANT MATERIAL SHALL BARE THE SAME RELATIONSHIP TO FINISHED GRADE AS TO THE ORIGINAL PLANTING GRADE PRIOR TO DIGGING.
6. THE NUMBER OF EACH INDIVIDUAL PLANT TYPE AND SIZE PROVIDED IN THE PLANT LIST OR ON THE PLAN IS FOR THE CONTRACTOR'S CONVENIENCE ONLY. IF A DISCREPANCY EXISTS BETWEEN THE NUMBER OF PLANTS ON THE LABEL AND THE NUMBER OF SYMBOLS SHOWN ON THE DRAWINGS, THE GREATER NUMBER SHALL APPLY.
7. NO SUBSTITUTION OF PLANT MATERIALS WILL BE ALLOWED WITHOUT THE PRIOR WRITTEN APPROVAL OF THE OWNER'S REPRESENTATIVE.
8. THE CONTRACTOR SHALL LOCATE, VERIFY AND MARK ALL EXISTING AND NEWLY INSTALLED UNDERGROUND UTILITIES PRIOR TO ANY LAWN WORK OR PLANTING. ANY CONFLICTS WHICH MIGHT OCCUR BETWEEN PLANTING AND UTILITIES SHALL IMMEDIATELY BE REPORTED TO THE OWNER SO THAT ALTERNATE PLANTING LOCATIONS CAN BE DETERMINED.
9. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED, SHALL RECEIVE SIX (6) INCHES OF LOAM AND SEED. NO FILL SHALL BE PLACED IN ANY WETLAND AREA.
10. THREE (3) INCH BARK MULCH IS TO BE USED AROUND THE TREE AND SHRUB PLANTING AS SPECIFIED IN THE DETAILS. WHERE BARK MULCH IS TO BE USED IN A CURBED ISLAND THE BARK MULCH SHALL MEET THE TOP INSIDE EDGE OF THE CURB. ALL OTHER AREAS SHALL RECEIVE SIX (6) INCHES OF LOAM AND SEED.
11. LANDSCAPING SHALL BE LOCATED WITHIN 150 FT OF EXTERIOR HOSE ATTACHMENT OR SHALL BE PROVIDED WITH AN IRRIGATION SYSTEM.
12. SEE PLANTING DETAILS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
13. TREE STAKES SHALL REMAIN IN PLACE FOR NO LESS THAN 6 MONTHS AND NO MORE THAN 1 YEAR.
14. PLANTING SHALL BE COMPLETED FROM APRIL 15TH THROUGH OCTOBER 1ST. NO PLANTING DURING JULY AND AUGUST UNLESS SPECIAL PROVISIONS ARE MADE FOR DROUGHT.
15. PARKING AREA PLANTED ISLANDS TO HAVE MINIMUM OF 1'-0" TOPSOIL PLACED TO WITHIN 3 INCHES OF THE TOP OF CURB ELEVATION REMOVE ALL CONSTRUCTION DEBRIS BEFORE PLACING TOPSOIL.
16. TREES SHALL BE PRUNED IN ACCORDANCE WITH THE LATEST EDITION OF ANSI A300 'TREES, SHRUBS AND OTHER WOOD PLANT MAINTENANCE STANDARD PRACTICES.
17. ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24 HOUR PERIOD AFTER PLANTING. ALL PLANTS SHALL BE WATERED WEEKLY, OR MORE OFTEN, IF NECESSARY DURING THE FIRST GROWING SEASON. LANDSCAPE CONTRACTOR SHALL COORDINATE WATERING SCHEDULE WITH OWNER DURING THE ONE (1) YEAR GUARANTEE PERIOD.
18. EXISTING TREES AND SHRUBS SHOWN ON THE PLAN ARE TO REMAIN UNDISTURBED. ALL EXISTING TREES AND SHRUBS SHOWN TO REMAIN ARE TO BE PROTECTED WITH A 4-FOOT SNOW FENCE PLACED AT THE DRIP LINE OF THE BRANCHES OR AT 8 FEET MINIMUM FROM THE TREE TRUNK. ANY EXISTING TREE OR SHRUB SHOWN TO REMAIN, WHICH IS REMOVED DURING CONSTRUCTION, SHALL BE REPLACED BY A TREE OF COMPARABLE SIZE AND SPECIES TREE OR SHRUB.
19. THE CONTRACTOR SHALL GUARANTEE ALL PLANTINGS TO BE IN GOOD HEALTHY, FLOURISHING AND ACCEPTABLE CONDITION FOR A PERIOD OF (1) YEAR BEGINNING AT THE DATE OF ACCEPTANCE OF SUBSTANTIAL COMPLETION. ALL GRASSES, TREES AND SHRUBS THAT, IN THE OPINION OF THE LANDSCAPE ARCHITECT, SHOW LESS THAN 80% HEALTHY GROWTH AT THE END OF ONE YEAR PERIOD SHALL BE REPLACED BY THE CONTRACTOR.
20. UPON EXPIRATION OF THE CONTRACTOR'S ONE YEAR GUARANTEE PERIOD, THE OWNER SHALL BE RESPONSIBLE FOR LANDSCAPE MAINTENANCE INCLUDING WATERING DURING PERIODS OF DROUGHT
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL PLANTING AND LAWNS AGAINST DAMAGE FROM ONGOING CONSTRUCTION. THIS PROTECTION SHALL BEGIN AT THE TIME THE PLANT IS INSTALLED AND CONTINUE UNTIL THE FORMAL ACCEPTANCE OF ALL THE PLANTINGS.
22. PRE-PURCHASE PLANT MATERIAL AND ARRANGE FOR DELIVERY TO MEET PROJECT SCHEDULE AS REQUIRED IT MAY BE NECESSARY TO PRE-DIG CERTAIN SPECIES WELL IN ADVANCE OF ACTUAL PLANTING DATES.

SEED MIX NOTES

1. SEED MIX "A" SHALL CONTAIN THE FOLLOWING SEED REQUIREMENTS AND BE APPLIED AT A RATE OF 40LB/AC OR APPROVED EQUAL.

SEED MIX	% BY WEIGHT
"REBEL II" TALL FESCUE	70%
"PALMER" PERENNIAL RYEGRASS	20%
"BARON" KENTUCKEY BLUEGRASS	10%

2. SEED MIX "B" SHALL BE NEW ENGLAND CONSERVATION/WILDLIFE MIX OR APPROVED EQUAL APPLIED AT A RATE OF 25LB/AC.

SEE SHEET C-176 FOR PLANT SCHEDULE

Tighe&Bond

STATE OF NEW HAMPSHIRE - PATRICK CRIMMINS - No. 12378 - LICENSED PROFESSIONAL ENGINEER
5/20/24

STATE OF NEW HAMPSHIRE - NEIL A. HANSEN - No. 15227 - LICENSED PROFESSIONAL ENGINEER
05/20/2024

SCALE IN FEET
0 40' 80'
GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid

PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PHASE 2
LANDSCAPE PLAN

SCALE: AS SHOWN

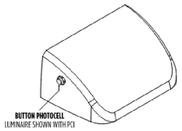
C-174

Last Save Date: May 17, 2024 - 3:31 PM By: NAHANSEN
Plot Date: May 17, 2024 - 3:31 PM By: Neil A. Hansen
T&B File Location: J:\LU\700 Lonza Biologics Expansion was 1576F\026. Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-174

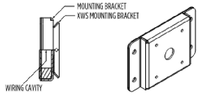
Battery Backup

- Emergency battery system provides 90-minutes of constant power to the LED system, ensuring code compliance.
- A test switch/indicator button is installed on the housing for ease of maintenance.
- 10w battery delivers ~1,500 lumens during emergency mode.
- 20w battery delivers ~3,000 lumens during emergency mode.

Luminaire shown with sensor & battery backup



BUTTON PHOTOCELL
LUMINAIRE SHOWN WITH PC1



Luminaire Schedule					
Symbol	Qty	Label	Arrangement	Description	[MANUFAC]
	3	S3	Single	MRM-LED-09L-SIL-3-UNV-DIM-30-70CRI-CXX / 48Q B3 S11G 25 S GA 4BC (25' AFG)	LSI INDUSTRIES, INC.
	4	P5-2	Back-Back	MRM-LED-12L-SIL-5W-UNV-DIM-30-70CRI-CXX / 48Q B3 S11G 20 D180 GA 4BC (20' AFG)	LSI INDUSTRIES, INC.
	7	S3	Single	MRM-LED-09L-SIL-3-UNV-DIM-30-70CRI-CXX / 48Q B3 S11G 20 S GA 4BC (20' AFG)	LSI INDUSTRIES, INC.
	1	S5-1	Single	MRM-LED-09L-SIL-5W-UNV-DIM-30-70CRI-CXX / 48Q B3 S11G 20 S GA 4BC (20' AFG)	LSI INDUSTRIES, INC.
	3	W3	Single	XWM-3-LED-12L-30-UE-CXX / WALL MTD 20' AFG	LSI INDUSTRIES, INC.
	10	W4	Single	XWM-FT-LED-12L-30-UE-CXX / WALL MTD 20' AFG	LSI INDUSTRIES, INC.
	36	WS	Single	XWS-LED-03L-SIL-FT-UNV-DIM-30-70CRI-CXX-EH / MTD 12' AFG	LSI INDUSTRIES, INC.
	3	WS2	Single	XWS-LED-03L-SIL-3-UNV-DIM-30-70CRI-CXX-EH / MTD 12' AFG	LSI INDUSTRIES, INC.

(100' R.O.W. PER REF. PLAN #7)
CORPORATE DRIVE

CONST COLUMN
MOUNTED FIXTURE (TYP)
(SEE ELEC DWGS)

MATCH LINE SHEET 1
MATCH LINE SHEET 2

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
5/20/24

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
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LICENSED
PROFESSIONAL ENGINEER
05/20/2024

SCALE IN FEET
0 40' 80'
GRAPHIC SCALE

Proposed Industrial Development

Lonza Biologics

Portsmouth,
New Hampshire

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PROJECT NO:	L-0700-013
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DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PHASE 2 PHOTOMETRIC LIGHTING PLAN

SCALE: AS SHOWN

C-177

Last Save Date: May 17, 2024 3:51 PM By: NAHANSEN
Plot Date: May 17, 2024 4:04 PM By: Neil A. Hansen
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576F\026. Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-177

GENERAL PROJECT INFORMATION

PROJECT LESSOR:	PEASE DEVELOPMENT AUTHORITY 55 INTERNATIONAL DRIVE PORTSMOUTH, NH 03801
PROJECT OWNER/ APPLICANT:	LONZA BIOLOGICS 101 INTERNATIONAL DRIVE PORTSMOUTH, NH 03801
PROJECT ADDRESS:	70 & 80 CORPORATE DRIVE PORTSMOUTH, NH 03801
PROJECT LATITUDE:	43°-04'-59.0"N
PROJECT LONGITUDE:	71°-48'-09.7"W

PROJECT DESCRIPTION

THE PROJECT CONSISTS OF THE EXPANSION OF LONZA BIOLOGICS, WHICH INCLUDES THE CONSTRUCTION OF 4 PROPOSED BUILDINGS, 1 PARKING GARAGE, AND ASSOCIATED SITE IMPROVEMENTS.

DISTURBED AREA

THE TOTAL AREA TO BE DISTURBED IS APPROXIMATELY 21.3 ACRES.

SOIL CHARACTERISTICS

BASED ON THE HIGH INTENSITY SOIL SURVEY PREPARED BY GOVE ENVIRONMENTAL SERVICES, INC. IN DECEMBER 2015, THE SITE SOILS VARY FROM WELL DRAINED TO VERY POORLY DRAINED AND PRIMARILY CONSIST OF SOMEWHAT POORLY DRAINED SOILS.

NAME OF RECEIVING WATERS

THE STORM WATER RUNOFF WILL ULTIMATELY DISCHARGE INTO HODGSON BROOK

CONSTRUCTION SEQUENCE OF MAJOR ACTIVITIES:

1. CUT AND CLEAR TREES.
2. CONSTRUCT TEMPORARY AND PERMANENT SEDIMENT, EROSION AND DETENTION CONTROL FACILITIES. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING OPERATIONS THAT WILL INFLUENCE STORMWATER RUNOFF SUCH AS:
   - NEW CONSTRUCTION
   - CONTROL OF DUST
   - NEARNESS OF CONSTRUCTION SITE TO RECEIVING WATERS
   - CONSTRUCTION DURING LATE WINTER AND EARLY SPRING
3. ALL PERMANENT DITCHES, SWALES, DETENTION, RETENTION AND SEDIMENTATION BASINS TO BE STABILIZED USING THE VEGETATIVE AND NON-STRUCTURAL BMPS PRIOR TO DIRECTING RUNOFF TO THEM.
4. CLEAR AND DISPOSE OF DEBRIS.
5. CONSTRUCT TEMPORARY CULVERTS AND DIVERSION CHANNELS AS REQUIRED.
6. GRADE AND GRAVEL ROADWAYS AND PARKING AREAS - ALL ROADS AND PARKING AREA SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
7. BEGIN PERMANENT AND TEMPORARY SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED AND MULCHED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
8. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, PERIMETER EROSION CONTROL MEASURES, SEDIMENT TRAPS, ETC., MULCH AND SEED AS REQUIRED.
9. SEDIMENT TRAPS AND/OR BASINS SHALL BE USED AS NECESSARY TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.
10. FINISH PAVING ALL ROADWAYS AND PARKING LOTS.
11. INSPECT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES.
12. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
13. REMOVE TRAPPED SEDIMENTS FROM COLLECTOR DEVICES AS APPROPRIATE AND THEN REMOVE TEMPORARY EROSION CONTROL MEASURES.

SPECIAL CONSTRUCTION NOTES:

1. THE CONSTRUCTION SEQUENCE MUST LIMIT THE DURATION AND AREA OF DISTURBANCE.
2. THE PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

EROSION CONTROL NOTES:

1. ALL EROSION CONTROL MEASURES AND PRACTICES SHALL CONFORM TO THE "NEW HAMPSHIRE STORMWATER MANUAL VOLUME 3: EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION" PREPARED BY THE NHDES.
2. PRIOR TO ANY WORK OR SOIL DISTURBANCE, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EROSION CONTROL MEASURES AS REQUIRED IN THE PROJECT MANUAL.
3. CONTRACTOR SHALL INSTALL TEMPORARY EROSION CONTROL BARRIERS, INCLUDING HAY BALES, SILT FENCES, MULCH BERMS, SILT SACKS AND SILT SOCKS AS SHOWN IN THESE DRAWINGS AS THE FIRST ORDER OF WORK.
4. SILT SACK INLET PROTECTION SHALL BE INSTALLED IN ALL EXISTING AND PROPOSED CATCH BASIN INLETS WITHIN THE WORK LIMITS AND BE MAINTAINED FOR THE DURATION OF THE PROJECT.
5. PERIMETER CONTROLS INCLUDING SILT FENCES, MULCH BERM, SILT SOCK, AND/OR HAY BALE BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT UNTIL NON-PAVED AREAS HAVE BEEN STABILIZED.
6. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION.
7. ALL DISTURBED AREAS NOT OTHERWISE BEING TREATED SHALL RECEIVE 6" LOAM, SEED AND FERTILIZER.
8. INSPECT ALL INLET PROTECTION AND PERIMETER CONTROLS WEEKLY AND AFTER EACH RAIN STORM OF 0.25 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
9. CONSTRUCT EROSION CONTROL BLANKETS ON ALL SLOPES STEEPER THAN 3:1.

STABILIZATION:

1. AN AREA SHALL BE CONSIDERED STABLE WHEN ONE OF THE FOLLOWING HAS OCCURRED:
   A. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
   B. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
   C. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED;
   D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.;
   E. IN AREAS TO BE PAVED, "STABLE" MEANS THAT BASE COURSE GRAVELS MEETING THE REQUIREMENTS OF NHDOT STANDARD FOR ROAD AND BRIDGE CONSTRUCTION, 2016, ITEM 304.2 HAVE BEEN INSTALLED.
2. WINTER STABILIZATION PRACTICES:
   A. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS;
   B. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS;
   C. AFTER NOVEMBER 15, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT;
3. STABILIZATION SHALL BE INITIATED ON ALL LOAM STOCKPILES, AND DISTURBED AREAS, WHERE CONSTRUCTION ACTIVITY SHALL NOT OCCUR FOR MORE THAN TWENTY-ONE (21) CALENDAR DAYS BY THE FOURTEENTH (14TH) DAY AFTER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED IN THAT AREA. STABILIZATION MEASURES TO BE USED INCLUDE:
   A. TEMPORARY SEEDING;
   B. MULCHING.
4. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
5. WHEN CONSTRUCTION ACTIVITY PERMANENTLY OR TEMPORARILY CEASES WITHIN 100 FEET OF NEARBY SURFACE WATERS OR DELINEATED WETLANDS, THE AREA SHALL BE STABILIZED WITHIN SEVEN (7) DAYS OR PRIOR TO A RAIN EVENT. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN THESE AREAS, SILT FENCES, MULCH BERMS, HAY BALE BARRIERS AND ANY EARTH/DIKES SHALL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED.
6. DURING CONSTRUCTION, RUNOFF WILL BE DIVERTED AROUND THE SITE WITH EARTH DIKES, PIPING OR STABILIZED CHANNELS WHERE POSSIBLE. SHEET RUNOFF FROM THE SITE WILL BE FILTERED THROUGH SILT FENCES, MULCH BERMS, HAY BALE BARRIERS, OR SILT SOCKS. ALL STORM DRAIN BASIN INLETS SHALL BE PROVIDED WITH FLARED END SECTIONS AND TRASH RACKS. THE SITE SHALL BE STABILIZED FOR THE WINTER BY NOVEMBER 15.

DUST CONTROL:

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST THROUGHOUT THE CONSTRUCTION PERIOD.
2. DUST CONTROL METHODS SHALL INCLUDE, BUT BE NOT LIMITED TO SPRINKLING WATER ON EXPOSED AREAS, COVERING LOADED DUMP TRUCKS LEAVING THE SITE, AND TEMPORARY MULCHING.
3. DUST CONTROL MEASURES SHALL BE UTILIZED SO AS TO PREVENT THE MIGRATION OF DUST FROM THE SITE TO ABUTTING AREAS.

STOCKPILES:

1. LOCATE STOCKPILES A MINIMUM OF 50 FEET AWAY FROM CATCH BASINS, SWALES, AND CULVERTS.
2. ALL STOCKPILES SHOULD BE SURROUNDED WITH TEMPORARY EROSION CONTROL MEASURES PRIOR TO THE ONSET OF PRECIPITATION.
3. PERIMETER BARRIERS SHOULD BE MAINTAINED AT ALL TIMES, AND ADJUSTED AS NEEDED TO ACCOMMODATE THE DELIVERY AND REMOVAL OF MATERIALS FROM THE STOCKPILE. THE INTEGRITY OF THE BARRIER SHOULD BE INSPECTED AT THE END OF EACH WORKING DAY.
4. PROTECT ALL STOCKPILES FROM STORMWATER RUN-OFF USING TEMPORARY EROSION CONTROL MEASURES SUCH AS BERMS, SILT SOCK, OR OTHER APPROVED PRACTICE TO PREVENT MIGRATION OF MATERIAL BEYOND THE IMMEDIATE CONFINES OF THE STOCKPILES.

OFF SITE VEHICLE TRACKING:

1. THE CONTRACTOR SHALL CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE(S) PRIOR TO ANY EXCAVATION ACTIVITIES.

VEGETATION:

1. TEMPORARY GRASS COVER:
   A. SEEDBED PREPARATION:
      a. APPLY FERTILIZER AT THE RATE OF 600 POUNDS PER ACRE OF 10-10-10. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF THREE (3) TONS PER ACRE;
   B. SEEDING:
      a. UTILIZE ANNUAL RYE GRASS AT A RATE OF 40 LBS/ACRE;
      b. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF TWO (2) INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED;
      c. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER). HYDROSEEDINGS, WHICH INCLUDE MULCH, MAY BE LEFT ON SOIL SURFACE. SEEDING RATES MUST BE INCREASED 10% WHEN HYDROSEEDING;
   C. MAINTENANCE:
      a. TEMPORARY SEEDING SHALL BE PERIODICALLY INSPECTED. AT A MINIMUM, 95% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES USED IN THE INTERIM (MULCH, FILTER BARRIERS, CHECK DAMS, ETC.).
2. VEGETATIVE PRACTICE:
   A. FOR PERMANENT MEASURES AND PLANTINGS:
      a. LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF THREE (3) TONS PER ACRE IN ORDER TO PROVIDE A PH VALUE OF 5.5 TO 6.5;
      b. FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 800 POUNDS PER ACRE OF 10-20-20 FERTILIZER;
      c. SOIL CONDITIONERS AND FERTILIZER SHALL BE APPLIED AT THE RECOMMENDED RATES AND SHALL BE THOROUGHLY WORKED INTO THE LOAM. LOAM SHALL BE RAKED UNTIL THE SURFACE IS FINELY PULVERIZED, SMOOTH AND EVEN, AND THEN COMPACTED TO AN EVEN SURFACE CONFORMING TO THE REQUIRED LINES AND GRADES WITH APPROVED ROLLERS WEIGHING BETWEEN 4-1/2 POUNDS AND 5-1/2 POUNDS PER INCH OF WIDTH;
      d. SEED SHALL BE SOWN AT THE RATE SHOWN BELOW. SOWING SHALL BE DONE ON A CALM, DRY DAY, PREFERABLY BY MACHINE, BUT IF BY HAND, ONLY BY EXPERIENCED WORKMEN. IMMEDIATELY BEFORE SEEDING, THE SOIL SHALL BE LIGHTLY RAKED. ONE HALF THE SEED SHALL BE SOWN IN ONE DIRECTION AND THE OTHER HALF AT RIGHT ANGLES TO THE ORIGINAL DIRECTION. IT SHALL BE LIGHTLY RAKED INTO THE SOIL TO A DEPTH NOT OVER 1/4 INCH AND ROLLED WITH A HAND ROLLER WEIGHING NOT OVER 100 POUNDS PER LINEAR FOOT OF WIDTH;
      e. HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AS INDICATED ABOVE;
      f. THE SURFACE SHALL BE WATERED AND KEPT MOIST WITH A FINE SPRAY AS REQUIRED, WITHOUT WASHING AWAY THE SOIL, UNTIL THE GRASS IS WELL ESTABLISHED. ANY AREAS WHICH ARE NOT SATISFACTORILY COVERED WITH GRASS SHALL BE RESEEDED, AND ALL NOXIOUS WEEDS REMOVED;
      g. THE CONTRACTOR SHALL PROTECT AND MAINTAIN THE SEEDED AREAS UNTIL ACCEPTED;
      h. A GRASS SEED MIXTURE CONTAINING THE FOLLOWING SEED REQUIREMENTS SHALL BE APPLIED AT A RATE OF 40 LB/AC OR APPROVED EUQAL:

SEED MIX	APPLICATION RATE
"REBEL II" TALL FESCUE	70%
"PALMER" PERENNIAL RYEGRASS	20%
"BARON" KENTUCKEY BLUEGRASS	10%

      IN NO CASE SHALL THE WEED CONTENT EXCEED ONE (1) PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH STATE AND FEDERAL SEED LAWS. SEEDING SHALL BE DONE NO LATER THAN SEPTEMBER 15. IN NO CASE SHALL SEEDING TAKE PLACE OVER SNOW.
3. DORMANT SEEDING (SEPTEMBER 15 TO FIRST SNOWFALL):
   A. FOLLOW PERMANENT MEASURES SLOPE, LIME, FERTILIZER AND GRADING REQUIREMENTS. APPLY SEED MIXTURE AT TWICE THE INDICATED RATE. APPLY MULCH AS INDICATED FOR PERMANENT MEASURES.

CONCRETE WASHOUT AREA:

1. THE CONCRETE DELIVERY TRUCKS SHALL, WHENEVER POSSIBLE, USE WASHOUT FACILITIES AT THEIR OWN PLANT OR DISPATCH FACILITY;
2. IF IT IS NECESSARY, SITE CONTRACTOR SHALL DESIGNATE SPECIFIC WASHOUT AREAS AND DESIGN FACILITIES TO HANDLE ANTICIPATED WASHOUT WATER;
3. CONTRACTOR SHALL LOCATE WASHOUT AREAS AT LEAST 150 FEET AWAY FROM STORM DRAINS, SWALES AND SURFACE WATERS OR DELINEATED WETLANDS;
4. INSPECT WASHOUT FACILITIES DAILY TO DETECT LEAKS OR TEARS AND TO IDENTIFY WHEN MATERIALS NEED TO BE REMOVED.

ALLOWABLE NON-STORMWATER DISCHARGES:

1. THE FOLLOWING ARE THE ONLY NON-STORMWATER DISCHARGES ALLOWED. ALL OTHER NON-STORMWATER DISCHARGES ARE PROHIBITED ON SITE:
   A. FIRE-FIGHTING ACTIVITIES;
   B. FIRE HYDRANT FLUSHING;
   C. WATERS USED TO WASH VEHICLES WHERE DETERGENTS ARE NOT USED;
   D. WATER USED TO CONTROL DUST;
   E. POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHING;
   F. ROUTINE EXTERNAL BUILDING WASH DOWN WHERE DETERGENTS ARE NOT USED;
   G. PAVEMENT WASH WATERS WHERE DETERGENTS ARE NOT USED;
   H. UNCONTAMINATED AIR CONDITIONING/COMPRESSOR CONDENSATION;
   I. UNCONTAMINATED GROUND WATER OR SPRING WATER;
   J. FOUNDATION OR FOOTING DRAINS WHICH ARE UNCONTAMINATED;
   K. LANDSCAPE IRRIGATION.

WASTE DISPOSAL:

1. WASTE MATERIAL:
   A. ALL WASTE MATERIALS SHALL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE SHALL BE DEPOSITED IN A DUMPSTER;
   B. NO CONSTRUCTION WASTE MATERIALS SHALL BE BURIED ON SITE;
   C. ALL PERSONNEL SHALL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
2. HAZARDOUS WASTE:
   A. ALL HAZARDOUS WASTE MATERIALS SHALL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER;
   B. SITE PERSONNEL SHALL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
3. SANITARY WASTE:
   A. ALL SANITARY WASTE SHALL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

SPILL PREVENTION:

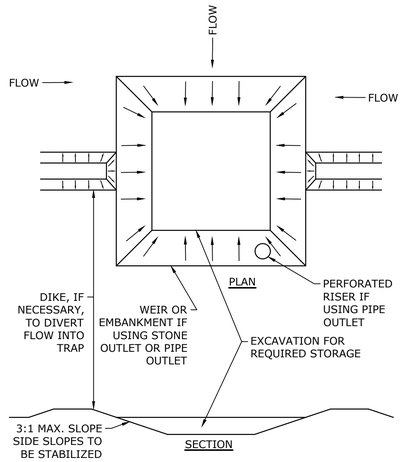
1. CONTRACTOR SHALL BE FAMILIAR WITH SPILL PREVENTION MEASURES REQUIRED BY LOCAL, STATE AND FEDERAL AGENCIES. AT A MINIMUM, CONTRACTOR SHALL FOLLOW THE BEST MANAGEMENT SPILL PREVENTION PRACTICES OUTLINED BELOW.
2. THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF:
   A. GOOD HOUSEKEEPING - THE FOLLOWING GOOD HOUSEKEEPING PRACTICE SHALL BE FOLLOWED ON SITE DURING CONSTRUCTION:
      a. ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB SHALL BE STORED ON SITE;
      b. ALL MATERIALS STORED ON SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE;
      c. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED;
      d. THE SITE SUPERINTENDENT SHALL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS;
      e. SUBSTANCES SHALL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER;
      f. WHENEVER POSSIBLE ALL OF A PRODUCT SHALL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
   B. HAZARDOUS PRODUCTS - THE FOLLOWING PRACTICES SHALL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
      g. PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE;
      h. ORIGINAL LABELS AND MATERIAL SAFETY DATA SHALL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION;
      i. SURPLUS PRODUCT THAT MUST BE DISPOSED OF SHALL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.
   C. PRODUCT SPECIFIC PRACTICES - THE FOLLOWING PRODUCT SPECIFIC PRACTICES SHALL BE FOLLOWED ON SITE:
      a. PETROLEUM PRODUCTS:
         - ALL ON SITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE LEAKAGE;
         - PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
      b. FERTILIZERS:
         - FERTILIZERS USED SHALL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS;
         - ONCE APPLIED FERTILIZER SHALL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER;
         - STORAGE SHALL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER SHALL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
      c. PAINTS:
         - ALL CONTAINERS SHALL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE;
         - EXCESS PAINT SHALL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM;
         - EXCESS PAINT SHALL BE DISPOSED OF PROPERLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
   D. SPILL CONTROL PRACTICES - IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION, THE FOLLOWING PRACTICES SHALL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:
      a. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE CLEARLY POSTED AND SITE PERSONNEL SHALL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES;
      b. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP SHALL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS SHALL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE;
      c. ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY;
      d. THE SPILL AREA SHALL BE KEPT WELL VENTILATED AND PERSONNEL SHALL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE;
      e. SPILLS OF TOXIC OR HAZARDOUS MATERIAL SHALL BE REPORTED TO THE APPROPRIATE LOCAL, STATE OR FEDERAL AGENCIES AS REQUIRED;
      f. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS SHALL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.
   E. VEHICLE FUELING AND MAINTENANCE PRACTICE:
      a. CONTRACTOR SHALL MAKE AN EFFORT TO PERFORM EQUIPTMENT/VEHICAL FUELING AND MAINTENANCE AT AN OFF-SITE FACILITY;
      b. CONTRACTOR SHALL PROVIDE AN ON-SITE FUELING AND MAINTENANCE AREA THAT IS CLEAN AND DRY;
      c. IF POSSIBLE THE CONTRACTOR SHALL KEEP AREA COVERED;
      d. CONTRACTOR SHALL KEEP A SPILL KIT AT THE FUELING AND MAINTENANCE AREA;
      e. CONTRACTOR SHALL REGULARLY INSPECT VEHICLES FOR LEAKS AND DAMAGE;
      f. CONTRACTOR SHALL USE DRIP PANS, DRIP CLOTHS, OR ABSORBENT PADS WHEN REPLACING SPENT FLUID.

EROSION CONTROL OBSERVATIONS AND MAINTENANCE PRACTICES

THIS PROJECT EXCEEDS ONE (1) ACRE OF DISTURBANCE AND THUS REQUIRES A SWPPP. THE SWPPP SHALL BE PREPARED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE FAMILIAR WITH THE SWPPP AND KEEP AN UPDATED COPY OF THE SWPPP ONSITE AT ALL TIMES.

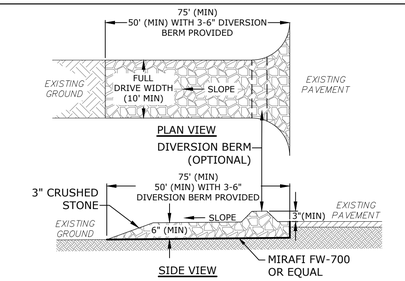
THE FOLLOWING REPRESENTS THE GENERAL OBSERVATION AND REPORTING PRACTICES THAT SHALL BE FOLLOWED AS PART OF THIS PROJECT:

1. OBSERVATIONS OF THE PROJECT FOR COMPLIANCE WITH THE SWPPP SHALL BE MADE BY THE CONTRACTOR AT LEAST ONCE A WEEK OR WITHIN 24 HOURS OF A STORM 0.25 INCHES OR GREATER;
2. AN OBSERVATION REPORT SHALL BE MADE AFTER EACH OBSERVATION AND DISTRIBUTED TO THE ENGINEER, THE OWNER, AND THE CONTRACTOR;
3. A REPRESENTATIVE OF THE SITE CONTRACTOR, SHALL BE RESPONSIBLE FOR MAINTENANCE AND REPAIR ACTIVITIES;
4. IF A REPAIR IS NECESSARY, IT SHALL BE INITIATED WITHIN 24 HOURS OF REPORT.



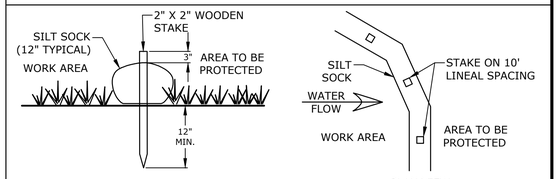
NOTES:
1. THE TRAP SHALL BE INSTALLED AS CLOSE TO THE DISTURBED AREA AS POSSIBLE.
2. THE MAXIMUM CONTRIBUTING AREA TO A SINGLE TRAP SHALL BE LESS THAN 5 ACRES.
3. THE MINIMUM VOLUME OF THE TRAP SHALL BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
4. TRAP OUTLET SHALL BE MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP.
5. TRAP SHALL DISCHARGE TO A STABILIZED AREA.
6. TRAP SHALL BE CLEANED WHEN 50 PERCENT OF THE ORIGINAL VOLUME IS FILLED.
7. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.

SEDIMENT TRAP
NO SCALE



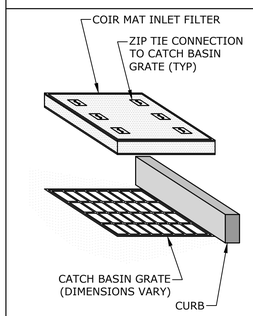
NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT FROM THE SITE. WHEN WASHING IS REQUIRED, IT SHALL BE DONE SO RUNOFF DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES, OR WATERWAYS

STABILIZED CONSTRUCTION ENTRANCE
NO SCALE



NOTES:
1. SILT SOCK SHALL BE SILT SOXX NATURAL ORIGINAL BY FILTREXX OR APPROVED EQUAL.
2. INSTALL SILT SOCK IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

SILT SOCK
NO SCALE



NOTES:
1. COIR MAT INLET FILTER SHALL BE STORM WATER INLET FILTER BY BLOCKSOM & CO. OR APPROVED EQUAL.
2. INSTALL AND MAINTAIN INLET PROTECTION IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

INLET PROTECTION
NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE - PATRICK CRIMMINS - No. 12378 - LICENSED PROFESSIONAL ENGINEER
5/20/24

STATE OF NEW HAMPSHIRE - NEIL A. HANSEN - No. 15227 - LICENSED PROFESSIONAL ENGINEER
05/20/2024

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
Q	3/4/2024	Amended Site Plan Review
P	1/29/2024	Ph2 Updated Drainage
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid
J	5/23/2022	Third Party Rev. Comments

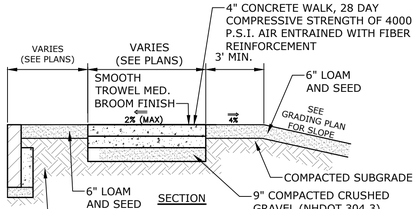
PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026C-C-DTLS.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

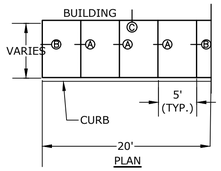
EROSION CONTROL NOTES & DETAILS SHEET

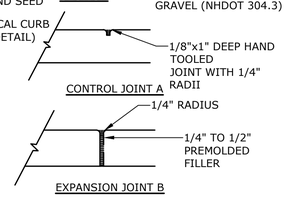
SCALE: AS SHOWN

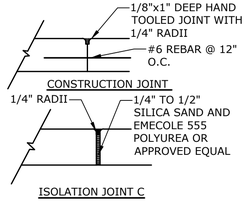
C-501

Last Save Date: March 1, 2024 11:29 AM By: CKRZCUIK
Plot Date: March 1, 2024 11:29 AM By: CKRZCUIK
T&B File Location: J:\LU\700 Lonza Biologics Expansion was 1576FU\026 Project Albacore\Drawings\AutoCAD_Solar\L-0700-026C-C-DTLS.dwg Layout Tab: C-501



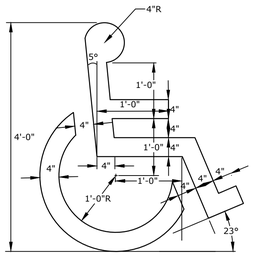






CONCRETE SIDEWALK WITH GRANITE CURB ALONG CORPORATE DRIVE

NO SCALE



NOTES:
1. SYMBOL SHALL BE CONSTRUCTED IN ALL ACCESSIBLE SPACES USING WHITE THERMOPLASTIC, REFLECTORIZED PAVEMENT PARKING MATERAL MEETING THE REQUIREMENTS OF ASTM D 4505.
2. SYMBOL SHALL BE CONSTRUCTED TO THE LATEST ADA, STATE AND LOCAL REQUIREMENTS.

ACCESSIBLE SYMBOL

NO SCALE

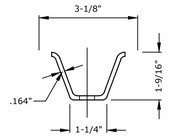
W11-2
30" X 30"
BLACK ON YELLOW

EV CHARGING SIGN
12"X18"
BLUE ON WHITE

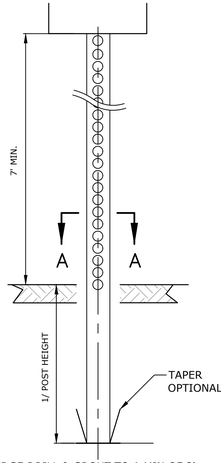
R1-1
30" X 30"
WHITE ON RED

R7-8
12" X 18"
BLUE AND GREEN
ON WHITE

R7-8P
18" X 9"
GREEN ON WHITE



SECTION A-A



* IN LEDGE DRILL & GROUT TO A MIN OF 2'

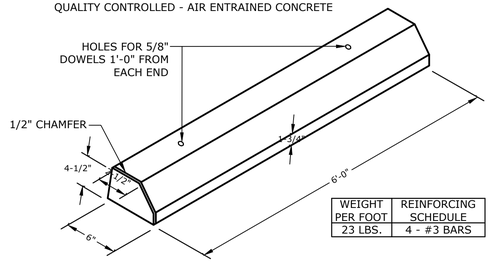
LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)
HOLES: 3/8" DIAMETER, 1" C-C FULL LENGTH
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASSTM A-576 (GRADE 1070 - 1080)

FINISH: SHALL BE PAINTED WITH TWO COATS OF AN APPROVED MEDIUM GREEN BAKED ON OR DRIED, PAINT OF WEATHER RESISTANT QUALITY. ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.

NOTE:
ALL SIGNS TO BE INSTALLED AS INDICATED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.

SIGN LEGEND & SIGN POST

NO SCALE

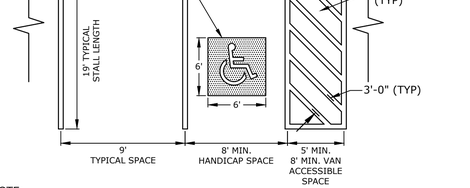


WEIGHT PER FOOT	REINFORCING SCHEDULE
23 LBS.	4 - #3 BARS

NOTE:
1. CURBING TO BE PINNED THROUGH ASPHALT PAVEMENT.

CONCRETE WHEEL STOP

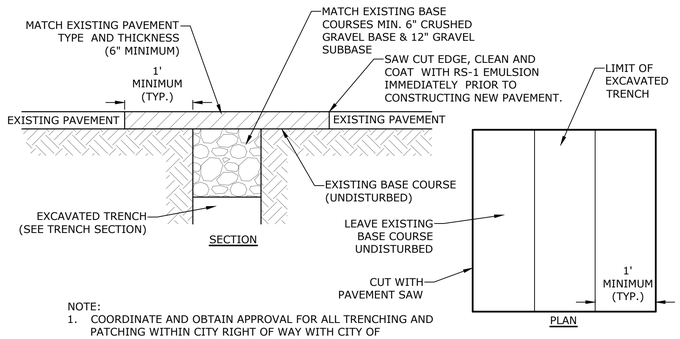
NO SCALE



NOTE:
1. ALL PAINT SHALL BE FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOLS & PARKING STALLS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT AND LOCAL AND STATE REQUIREMENTS.
3. FINISH PAVEMENT GRADES AT ALL HANDICAP ACCESSIBLE STALLS AND PAINTED ACCESS AISLES SHALL NOT EXCEED 2% IN ANY DIRECTION.

STALL STRIPING-SINGLE STRIPE

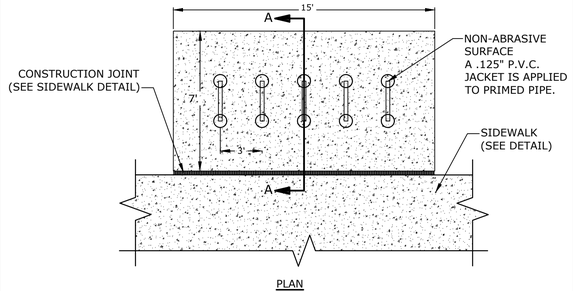
NO SCALE

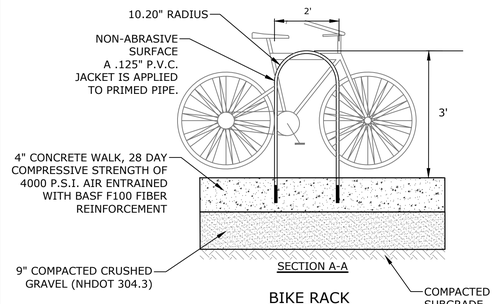


NOTE:
1. COORDINATE AND OBTAIN APPROVAL FOR ALL TRENCHING AND PATCHING WITHIN CITY RIGHT OF WAY WITH CITY OF PORTSMOUTH DPW PRIOR TO COMMENCING WORK.

ROADWAY TRENCH PATCH

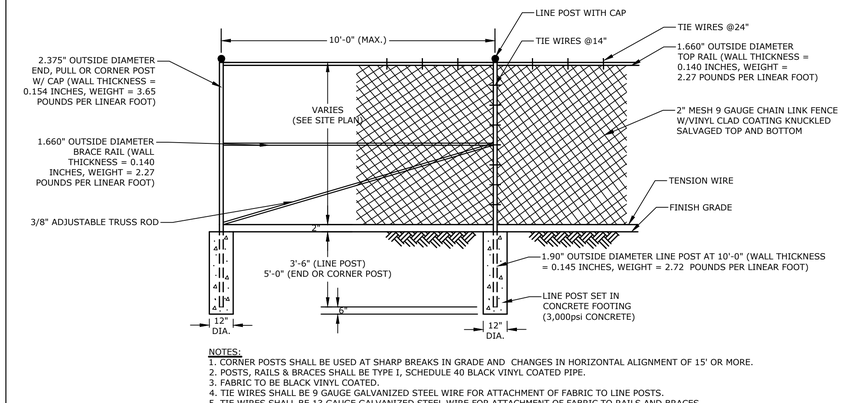
NO SCALE





BIKE RACK

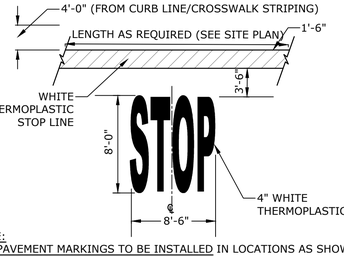
NO SCALE



NOTES:
1. CORNER POSTS SHALL BE USED AT SHARP BREAKS IN GRADE AND CHANGES IN HORIZONTAL ALIGNMENT OF 15' OR MORE.
2. POSTS, RAILS & BRACES SHALL BE TYPE I, SCHEDULE 40 BLACK VINYL COATED PIPE.
3. FABRIC TO BE BLACK VINYL COATED.
4. TIE WIRES SHALL BE 9 GAUGE GALVANIZED STEEL WIRE FOR ATTACHMENT OF FABRIC TO LINE POSTS.
5. TIE WIRES SHALL BE 13 GAUGE GALVANIZED STEEL WIRE FOR ATTACHMENT OF FABRIC TO RAILS AND BRACES.
6. HOG RING TIES SHALL BE 12- 1/2 GAUGE GALVANIZED STEEL WIRE FOR ATTACHMENT OF FABRIC TO TENSION WIRE.
7. COORDINATE FINAL CHAIN LINK FENCE DESIGN WITH BUILDING DRAWINGS AND UTILITY YARD CONCRETE SLAB DESIGN.

CHAIN LINK FENCE

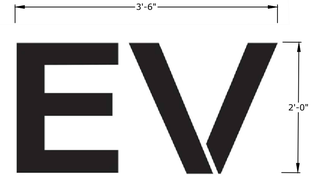
NO SCALE



NOTE:
1. PAVEMENT MARKINGS TO BE INSTALLED IN LOCATIONS AS SHOWN ON SITE PLAN.
2. STRIPING SHALL BE CONSTRUCTED USING WHITE THERMO PLASTIC, REFLECTERIZED PAVEMENT MARKING MATERIAL MEETING THE REQUIREMENTS OF ASTM D 4505

STOP BAR AND LEGEND

NO SCALE



NOTES:
1. SYMBOL SHALL BE CONSTRUCTED IN ALL ELECTRIC VEHICLE SPACES USING FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOL SHALL BE CONSTRUCTED TO THE LATEST STATE AND LOCAL REQUIREMENTS.

EV CHARGING SYMBOL

NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE - PROFESSIONAL ENGINEER
PATRICK CRIMMINS
No. 12378
LICENSED
5/20/24

STATE OF NEW HAMPSHIRE - PROFESSIONAL ENGINEER
NEIL A. HANSEN
No. 15227
LICENSED
05/20/2024

Proposed Industrial Development

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
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PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026C-C-DTLS.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

DETAILS SHEET

SCALE: AS SHOWN

C-503

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Plot Date: March 1, 2024 11:29 AM By: Kathleen Krzcuik
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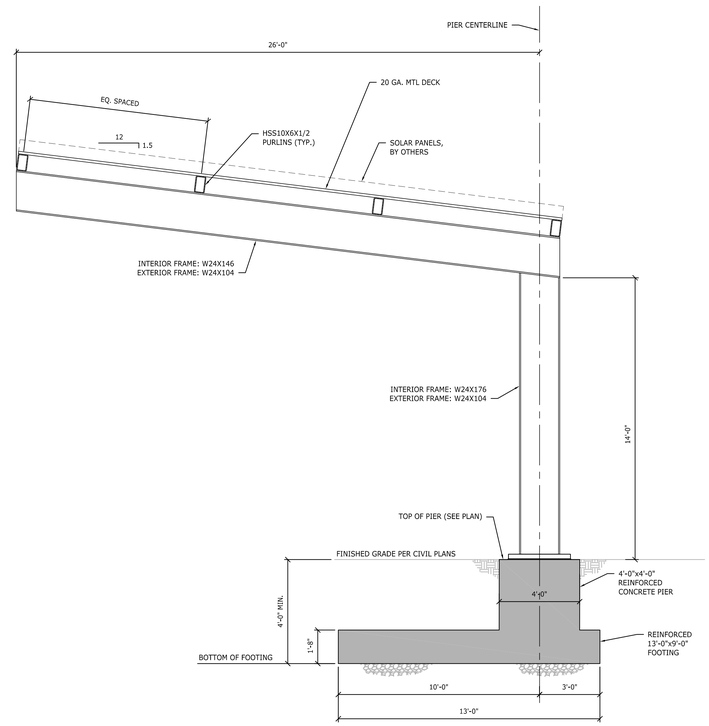
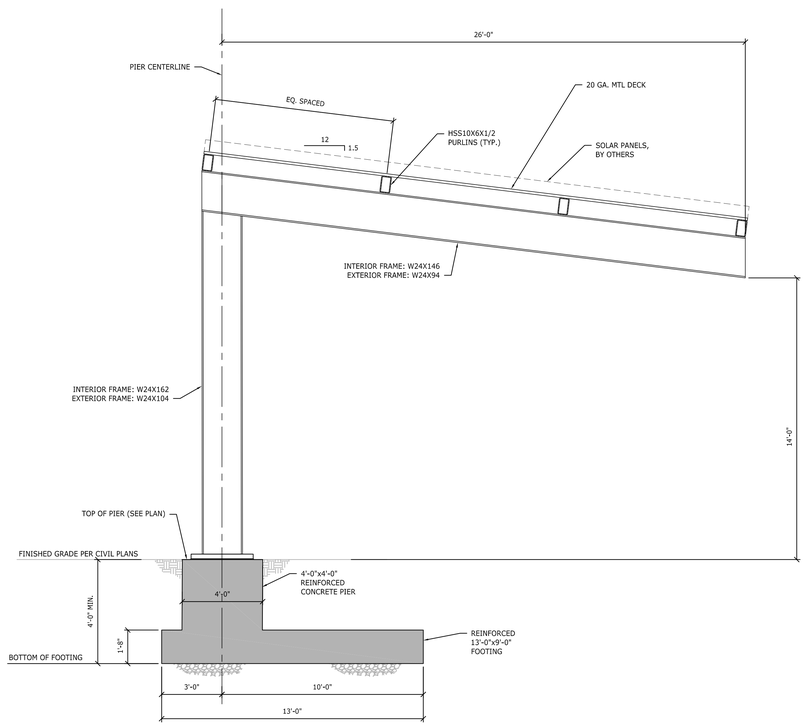
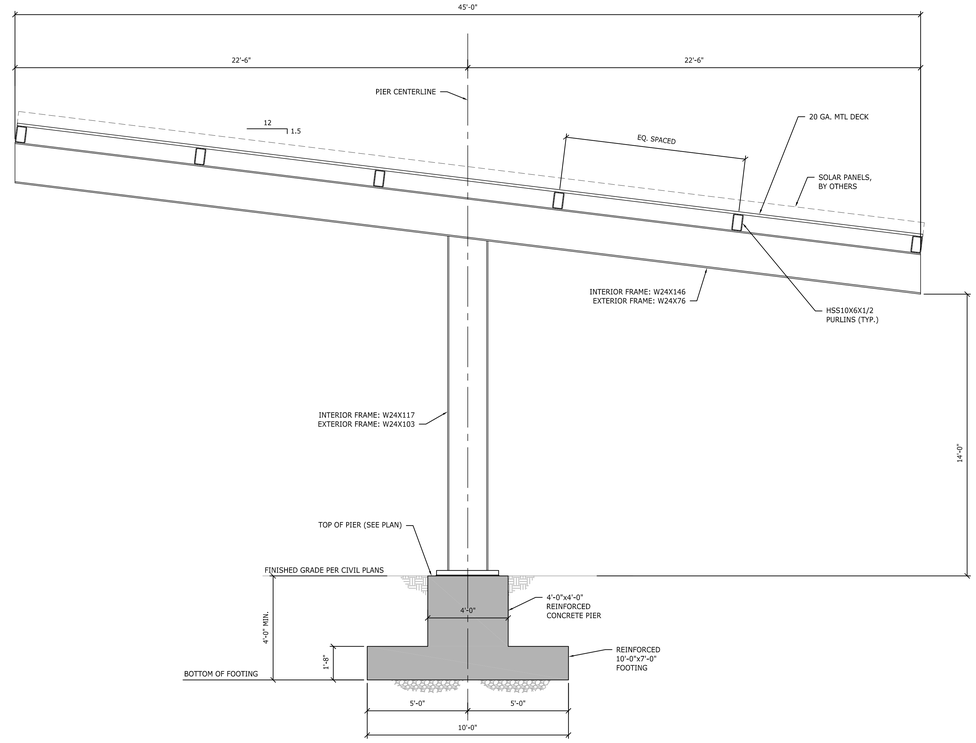


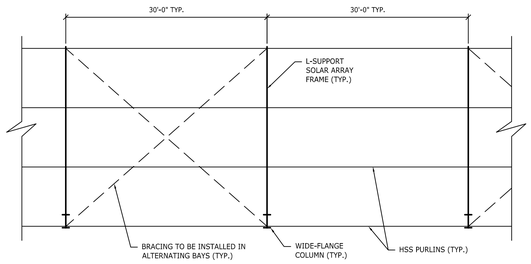
1 L-SUPPORT CANOPY FRAME SECTION - OPTION 1
8-018-3-2120 3/8" = 1'-0"



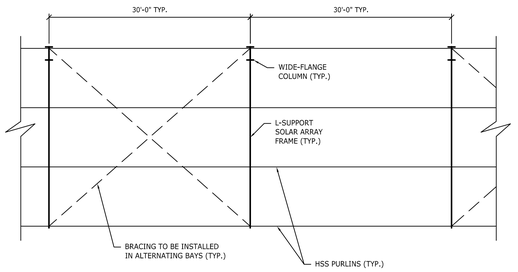
2 L-SUPPORT CANOPY FRAME SECTION - OPTION 2
8-018-3-2120 3/8" = 1'-0"



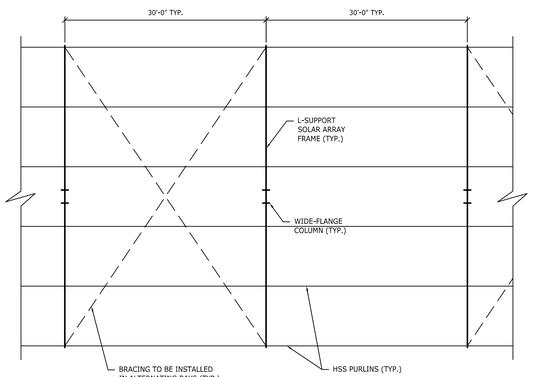
3 T-SUPPORT CANOPY FRAME SECTION
8-018-3-2120 3/8" = 1'-0"



4 L-SUPPORT CANOPY FRAME PLAN - OPTION 1
8-018-3-2120 3/8" = 1'-0"



5 L-SUPPORT CANOPY FRAME PLAN - OPTION 2
8-018-3-2120 3/8" = 1'-0"



6 T-SUPPORT CANOPY FRAME PLAN
8-018-3-2120 3/8" = 1'-0"

SOLAR CANOPY NOTES:

1. CONCEPTUAL FRAME IS DESIGNED FOR MAX SPACING OF 30'-0" O.C. BETWEEN SUPPORTS.
2. OVERALL CANOPY DIMENSIONS SHOWN ARE APPROXIMATE. NEW HSS PURLINS TO BE POSITIVELY ATTACHED ON TOP FLANGE OF CANOPY FRAMES WITH MAX SPACING OF 8'-0".
3. 20 GA. ROOF DECK AND TO BE INSTALLED SPANNING OVER PURLINS, SOLAR PANELS TO BE PROVIDED BY OTHERS.

PRELIMINARY NOT FOR CONSTRUCTION

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REVISION	DATE	DESCRIPTION	BY
A	23-FEB-24	PV BID ISSUE	MGM
B	20-MAY-24	PV BID ISSUE	MGM

CLIENT

LONZA

ALBACORE PROJECT

SCALE
1" = 1'-0" 1/2" = 1'-0" 0
3/8" = 1'-0" 1/8" = 1'-0" 0
3" = 1'-0"
3/16" = 1'-0" 3/32" = 1'-0" 0
1/16" = 1'-0" 1/32" = 1'-0" 0
3" = 1'-0"
1 1/2" = 1'-0" 3/4" = 1'-0" 0

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XREF FILE(S)

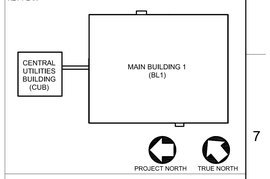
ENGINEER

ARCHITECT

DESIGNER

PARE

KEY PLAN



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DATE:

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DRAWING TITLE

SOLAR CANOPY CONCEPT DETAILS

Tags

Drawn By	Date Drawn	Project Number	P&ID Number	DWG Filename	Revision
JDB	02-23-24	MAD23047.03			B
Checked By	Date Checked	Scale	Drawing Number		
MGM	05-20-24	AS NOTED	8-018-3-2120		

Drainage Memorandum

TO: Pease Development Authority (PDA)

FROM: Neil A. Hansen, PE
Patrick M. Crimmins, PE

COPY: Lonza Biologics

DATE: May 20, 2024

1.0 Project Description

The proposed work includes the addition of Solar Canopies over the previously approved 150-space surface parking lot associated with Phase 2 of the Iron Parcel Development project. These Solar Canopies are planned to be removed along with the 150-space parking lot before the execution of the Master Plan, therefore there will be no changes to the Master Plan Drainage Design.

The Phase 2 drainage analysis has been updated and revised to include the 4'x4' concrete footings and 8'x22' concrete equipment pad. The proposed change includes the addition of approximately 672 SF of impervious surfaces. Although the addition of this area is very minimal in perspective to the whole watershed area (1,376,888 SF), we have prepared this technical memo to confirm that the previously approved Phase 2 drainage design and gravel wetlands are sized appropriately to accommodate this slight increase in impervious area.

2.0 Drainage Analysis

The previously approved Phase 2 Drainage Calculation has been updated to analyze the slight increase in impervious area and can be found in Attachment A. Subcatchment 1.0 has been updated to convert 304 SF of the previously grass surface to impervious surface. This additional 304 SF is approximately 0.09% of the total impervious area (314,795 SF) for this watershed.

Subcatchment 1.1 has been updated to convert 368 SF of the previously grass surface to impervious surface. This addition of 368 SF is approximately 0.7% of the total impervious area (48,674 SF) for this watershed.

STATE OF NEW HAMPSHIRE – NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER –
5/20/2024

STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER –
5/20/2024

2.1 Peak Rate Comparisons

The following table summarizes and compares the Phase-2 2023 Approved, proposed Phase-2 2024 Amendment, and Master Plan pre- and post-development peak runoff rates for the 2-year, 10-year, 25-year and 50-year storm events at each point of analysis. These points of analysis remain unchanged from the previously prepared and approved drainage analysis.

Table 2.1 – Peak Flow Rate Comparison

Point of Analysis	Phase	Pre 1-Year Storm (cfs)	Pre/**Post** 2-Year Storm (cfs)	Pre/**Post** 10-Year Storm (cfs)	Pre/**Post** 25-Year Storm (cfs)	Pre/**Post** 50-Year Storm (cfs)
PA1	Phase 2 (2023 Approval)	16.58	24.86/**9.25**	52.70/**31.22**	76.06/**56.26**	98.56/**74.09**
	Phase 2 (2024 Amendment)	16.58	24.86/**9.25**	52.70/**31.22**	76.06/**56.26**	98.56/**74.09**
	Master	16.58	24.86/**9.41**	52.70/**39.92**	76.06/**66.14**	98.56/**83.35**
PA2	Phase 2 (2023 Approval)	3.38	4.41/**3.10**	7.49/**5.36**	9.90/**7.12**	12.13/**8.76**
	Phase 2 (2024 Amendment)	3.38	4.41/**3.10**	7.49/**5.36**	9.90/**7.12**	12.13/**8.76**
	Master	3.38	4.41/**3.72**	7.49/**5.94**	9.90/**7.66**	12.13/**9.25**

2.2 Stormwater Treatment

Runoff from the newly created impervious surfaces will be directed to either of the previously approved Gravel Wetland 1 (POND 1.0) or Gravel Wetland 2 (POND 1.1). The following sections outline the treatment capacities of both gravel wetlands.

Gravel Wetland 1

Gravel Wetland 1 has a design capacity to treat 333,950 SF of impervious area for its 462,599 SF watershed area. The proposed change is to add 304 SF of impervious surface to the previously approved 314,491 SF of impervious surface for an amended total of 314,795 SF of impervious surface. This 314,795 SF is well within the gravel wetland design capacity of 333,950 SF of impervious surface.

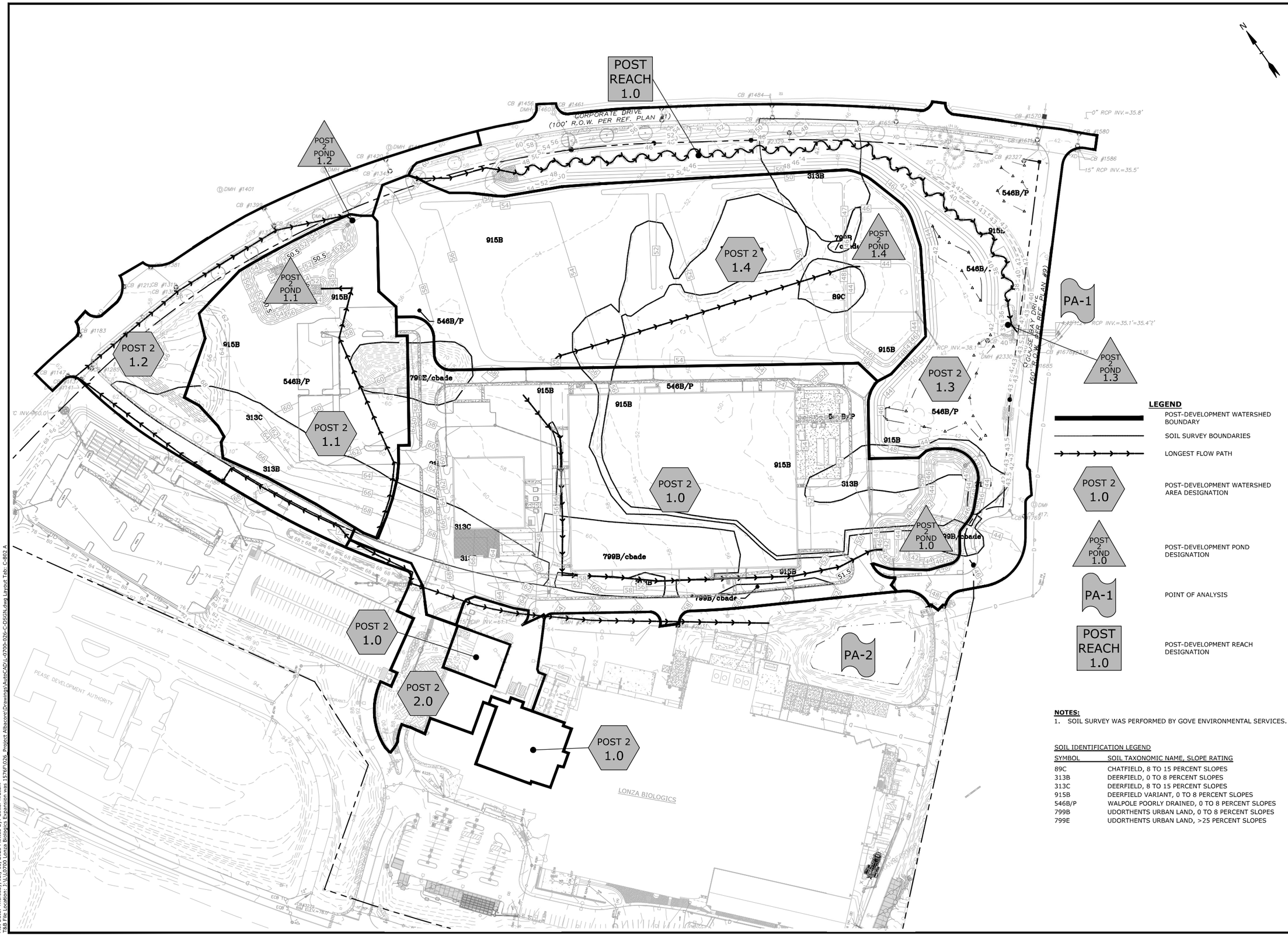
Gravel Wetland 2

Gravel Wetland 2 has a design capacity to treat 142,418 SF of impervious area for its 242,496 SF watershed area. The proposed change is to add 368 SF of impervious surface to the previously approved 48,306 SF of impervious surface for an amended total of 48,674 SF of impervious surface. This 48,674 SF is well within the gravel wetland design capacity of 142,418 SF of impervious surface.

3.0 Conclusion

The proposed amendment will result in no change to the previously approved post-development peak runoff rates for Phase 2 and does not affect the Master Plan Drainage design. The net increase in impervious areas resulting from the proposed work will be directed to either Gravel Wetland 1 or Gravel Wetland 2 which both have the capacity to treat the slight increase in impervious surfaces.

Phase 2 (2023 Approval) Post-Development Calculations



LEGEND

- POST-DEVELOPMENT WATERSHED BOUNDARY
- SOIL SURVEY BOUNDARIES
- LONGEST FLOW PATH
- POST 2 1.0 — POST-DEVELOPMENT WATERSHED AREA DESIGNATION
- POST 2 POND 1.0 — POST-DEVELOPMENT POND DESIGNATION
- PA-1 — POINT OF ANALYSIS
- POST REACH 1.0 — POST-DEVELOPMENT REACH DESIGNATION

SCALE IN FEET
0 80' 160'
GRAPHIC SCALE

NOTES:

1. SOIL SURVEY WAS PERFORMED BY GOVE ENVIRONMENTAL SERVICES.

SOIL IDENTIFICATION LEGEND

SYMBOL	SOIL TAXONOMIC NAME, SLOPE RATING
89C	CHATFIELD, 8 TO 15 PERCENT SLOPES
313B	DEERFIELD, 0 TO 8 PERCENT SLOPES
313C	DEERFIELD, 8 TO 15 PERCENT SLOPES
915B	DEERFIELD VARIANT, 0 TO 8 PERCENT SLOPES
546B/P	WALPOLE POORLY DRAINED, 0 TO 8 PERCENT SLOPES
799B	UDORTHENTS URBAN LAND, 0 TO 8 PERCENT SLOPES
799E	UDORTHENTS URBAN LAND, >25 PERCENT SLOPES

Tighe&Bond

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
L	7/17/2023	Amended Site Plan Review
K	5/5/2023	Phase 1B Issued for Bid
J	3/15/2023	Phase 1B Issued for Preliminary Pricing
I	1/9/2023	Admin. Approval Submission
H	12/10/2021	Planning Board Stipulation
G	8/19/2019	Admin. Approval Submission
F	11/6/2018	P.B. Submission

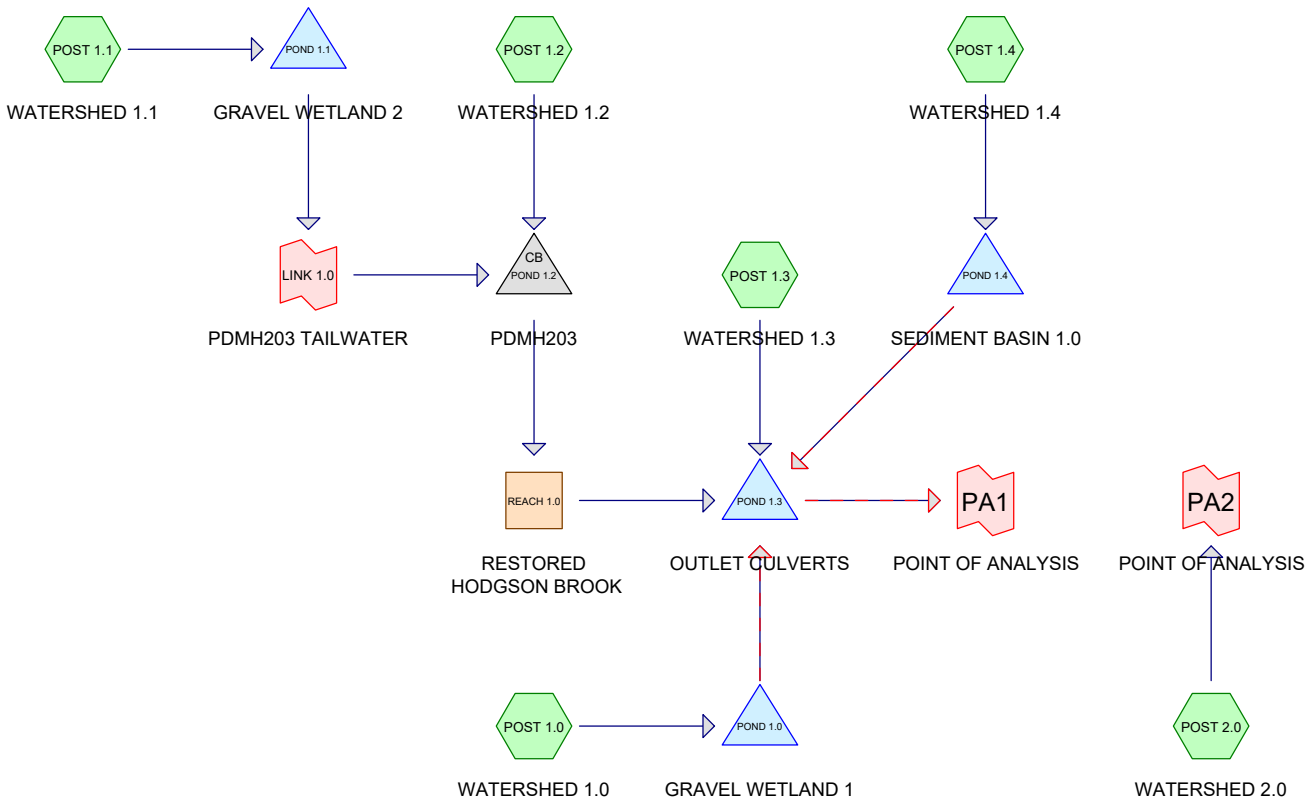
PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PHASE 2
POST-DEVELOPMENT
WATERSHED AREA PLAN

SCALE: AS SHOWN

C-802 A

Last Save Date: July 13, 2023 3:42 PM By: CKRZCUIK
Plot Date: Thursday, July 13, 2023 3:43 PM By: CKRZCUIK
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576F\026_Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-802 A



Subcat Reach Pond Link

Routing Diagram for L-0700-26 POST P2
Prepared by Tighe & Bond, Printed 7/13/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.312	61	>75% Grass cover, Good, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4)
13.558	74	>75% Grass cover, Good, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
1.467	80	>75% Grass cover, Good, HSG D (POST 1.0, POST 1.3, POST 1.4)
0.514	58	Meadow, non-grazed, HSG B (POST 1.3)
1.662	71	Meadow, non-grazed, HSG C (POST 1.3)
0.639	98	Paved parking, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3)
6.959	98	Paved parking, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
0.137	98	Paved parking, HSG D (POST 1.0, POST 1.3)
0.120	98	Roofs, HSG B (POST 1.0)
3.526	98	Roofs, HSG C (POST 1.0, POST 2.0)
0.714	98	Roofs, HSG D (POST 1.0)
31.609	**82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.586	HSG B	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4
25.705	HSG C	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0
2.318	HSG D	POST 1.0, POST 1.3, POST 1.4
0.000	Other	
31.609		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=440,332 sf 71.42% Impervious Runoff Depth>2.61"
Flow Length=933' Tc=11.4 min CN=90 Runoff=25.38 cfs 2.201 af

Subcatchment POST 1.1: WATERSHED Runoff Area=157,428 sf 30.68% Impervious Runoff Depth>1.63"
Flow Length=464' Tc=8.3 min CN=78 Runoff=6.25 cfs 0.492 af

Subcatchment POST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>2.34"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=6.94 cfs 0.511 af

Subcatchment POST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>1.62"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=5.96 cfs 0.929 af

Subcatchment POST 1.4: WATERSHED 1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>1.36"
Flow Length=585' Tc=13.5 min CN=74 Runoff=8.76 cfs 0.822 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>2.34"
Flow Length=758' Tc=5.0 min CN=87 Runoff=3.10 cfs 0.221 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.63' Max Vel=2.08 fps Inflow=6.94 cfs 0.511 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=4.97 cfs 0.507 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.02' Storage=67,987 cf Inflow=25.38 cfs 2.201 af
Primary=0.96 cfs 0.874 af Secondary=0.00 cfs 0.000 af Outflow=0.96 cfs 0.874 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=52.38' Storage=21,415 cf Inflow=6.25 cfs 0.492 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.38' Inflow=6.94 cfs 0.511 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=6.94 cfs 0.511 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.16' Storage=8,981 cf Inflow=9.25 cfs 3.060 af
Primary=9.25 cfs 2.856 af Secondary=0.00 cfs 0.000 af Outflow=9.25 cfs 2.856 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=44.62' Storage=21,007 cf Inflow=8.76 cfs 0.822 af
Primary=0.51 cfs 0.751 af Secondary=0.00 cfs 0.000 af Outflow=0.51 cfs 0.751 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=9.25 cfs 2.856 af
Primary=9.25 cfs 2.856 af

Link PA2: POINT OF ANALYSIS Inflow=3.10 cfs 0.221 af
Primary=3.10 cfs 0.221 af

Total Runoff Area = 31.609 ac Runoff Volume = 5.176 af Average Runoff Depth = 1.96"
61.73% Pervious = 19.513 ac 38.27% Impervious = 12.096 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=440,332 sf 71.42% Impervious Runoff Depth>4.43"
Flow Length=933' Tc=11.4 min CN=90 Runoff=42.01 cfs 3.732 af

Subcatchment POST 1.1: WATERSHED Runoff Area=157,428 sf 30.68% Impervious Runoff Depth>3.21"
Flow Length=464' Tc=8.3 min CN=78 Runoff=12.40 cfs 0.966 af

Subcatchment POST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>4.11"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=11.94 cfs 0.897 af

Subcatchment POST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>3.18"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=11.87 cfs 1.826 af

Subcatchment POST 1.4: WATERSHED 1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>2.83"
Flow Length=585' Tc=13.5 min CN=74 Runoff=18.77 cfs 1.708 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>4.11"
Flow Length=758' Tc=5.0 min CN=87 Runoff=5.36 cfs 0.388 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.82' Max Vel=2.20 fps Inflow=11.94 cfs 0.897 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=6.12 cfs 0.891 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.78' Storage=83,438 cf Inflow=42.01 cfs 3.732 af
Primary=9.22 cfs 2.105 af Secondary=5.86 cfs 0.170 af Outflow=15.08 cfs 2.275 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=54.11' Storage=42,049 cf Inflow=12.40 cfs 0.966 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.72' Inflow=11.94 cfs 0.897 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=11.94 cfs 0.897 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.77' Storage=13,560 cf Inflow=31.34 cfs 5.942 af
Primary=31.22 cfs 5.655 af Secondary=0.00 cfs 0.000 af Outflow=31.22 cfs 5.655 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=45.79' Storage=50,580 cf Inflow=18.77 cfs 1.708 af
Primary=0.68 cfs 0.950 af Secondary=0.00 cfs 0.000 af Outflow=0.68 cfs 0.950 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=31.22 cfs 5.655 af
Primary=31.22 cfs 5.655 af

Link PA2: POINT OF ANALYSIS Inflow=5.36 cfs 0.388 af
Primary=5.36 cfs 0.388 af

Total Runoff Area = 31.609 ac Runoff Volume = 9.517 af Average Runoff Depth = 3.61"
61.73% Pervious = 19.513 ac 38.27% Impervious = 12.096 ac

Summary for Subcatchment POST 1.0: WATERSHED 1.0

Runoff = 42.01 cfs @ 12.16 hrs, Volume= 3.732 af, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
5,235	98	Roofs, HSG B
29,148	61	>75% Grass cover, Good, HSG B
18,966	98	Paved parking, HSG B
143,455	98	Roofs, HSG C
82,022	74	>75% Grass cover, Good, HSG C
110,236	98	Paved parking, HSG C
31,119	98	Roofs, HSG D
14,671	80	>75% Grass cover, Good, HSG D
5,480	98	Paved parking, HSG D
440,332	90	Weighted Average
125,841		28.58% Pervious Area
314,491		71.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.2	32	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	19	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	162	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.4	84	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.5	113	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
1.2	299	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.4	94	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.1	46	0.0240	11.16	35.05	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
0.0	5	0.0800	7.16	0.98	**Pipe Channel,** 5.0" Round Area= 0.1 sf Perim= 1.3' r= 0.10' n= 0.013
0.0	9	0.0110	9.90	69.95	**Pipe Channel,**

36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
n= 0.013

11.4	933	Total

Summary for Subcatchment POST 1.1: WATERSHED 1.1

Runoff = 12.40 cfs @ 12.12 hrs, Volume= 0.966 af, Depth> 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
36,403	61	>75% Grass cover, Good, HSG B
3,210	98	Paved parking, HSG B
72,719	74	>75% Grass cover, Good, HSG C
45,096	98	Paved parking, HSG C
157,428	78	Weighted Average
109,122		69.32% Pervious Area
48,306		30.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	100	0.0625	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
2.2	312	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	33	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	19	0.3300	8.62		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.3	464	Total			

Summary for Subcatchment POST 1.2: WATERSHED 1.2

Runoff = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af, Depth> 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
9,848	61	>75% Grass cover, Good, HSG B
4,784	98	Paved parking, HSG B
37,701	74	>75% Grass cover, Good, HSG C
61,646	98	Paved parking, HSG C
113,979	87	Weighted Average
47,549		41.72% Pervious Area
66,430		58.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0100	1.12		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.0	153	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	343	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	13	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.8	453	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
0.4	129	0.0050	5.91	29.00	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Corrugated PE, smooth interior
6.4	1,191	Total			

Summary for Subcatchment POST 1.3: WATERSHED 1.3

Runoff = 11.87 cfs @ 12.63 hrs, Volume= 1.826 af, Depth> 3.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
1,830	61	>75% Grass cover, Good, HSG B
22,404	58	Meadow, non-grazed, HSG B
896	98	Paved parking, HSG B
131,991	74	>75% Grass cover, Good, HSG C
68,446	98	Paved parking, HSG C
72,396	71	Meadow, non-grazed, HSG C
1,638	80	>75% Grass cover, Good, HSG D
499	98	Paved parking, HSG D
300,100	78	Weighted Average
230,259		76.73% Pervious Area
69,841		23.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0130	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.1	52	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	27	0.2720	7.82		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
33.8	1,346	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
45.9	1,525	Total			

Summary for Subcatchment POST 1.4: WATERSHED 1.4

Runoff = 18.77 cfs @ 12.19 hrs, Volume= 1.708 af, Depth> 2.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
23,477	61	>75% Grass cover, Good, HSG B
243,330	74	>75% Grass cover, Good, HSG C
1,334	98	Paved parking, HSG C
47,586	80	>75% Grass cover, Good, HSG D
0	96	Gravel surface, HSG D
315,727	74	Weighted Average
314,393		99.58% Pervious Area
1,334		0.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0245	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
5.1	465	0.0103	1.52		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	20	0.3300	8.62		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.5	585	Total			

Summary for Subcatchment POST 2.0: WATERSHED 2.0

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af, Depth> 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
10,145	98	Roofs, HSG C
22,815	74	>75% Grass cover, Good, HSG C
16,376	98	Paved parking, HSG C
49,336	87	Weighted Average
22,815		46.24% Pervious Area
26,521		53.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0164	1.36		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.3	48	0.0164	2.60		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	130	0.0140	7.03	12.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.5	70	0.0250	2.37		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.3	410	0.0050	5.09	16.00	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
3.6	758	Total, Increased to minimum Tc = 5.0 min			

Summary for Reach REACH 1.0: RESTORED HODGSON BROOK

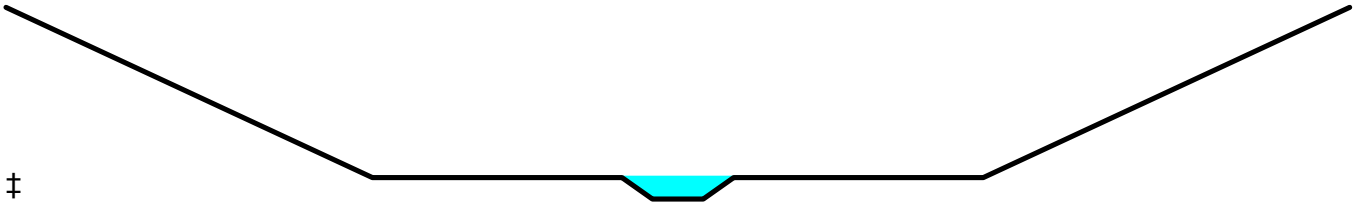
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

Inflow Area = 6.231 ac, 42.27% Impervious, Inflow Depth > 1.73" for 10 Year event
Inflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af
Outflow = 6.12 cfs @ 12.86 hrs, Volume= 0.891 af, Atten= 49%, Lag= 45.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.20 fps, Min. Travel Time= 9.9 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 25.6 min

Peak Storage= 6,846 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.82'
Bank-Full Depth= 6.75' Flow Area= 291.0 sf, Capacity= 2,720.29 cfs

Custom cross-section, Length= 1,309.0' Slope= 0.0092 '/' (101 Elevation Intervals)
Constant n= 0.040 Winding stream, pools & shoals
Inlet Invert= 48.00', Outlet Invert= 36.00'



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Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	12.00	0.00
18.00	6.00	6.00
30.25	6.00	6.00
31.75	5.25	6.75
34.25	5.25	6.75
35.75	6.00	6.00
48.00	6.00	6.00
66.00	12.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	2.5	0	0.00
0.75	3.0	30.4	3,927	2.28
6.75	291.0	68.3	380,919	2,720.29

Summary for Pond POND 1.0: GRAVEL WETLAND 1

[95] Warning: Outlet Device #4 rise exceeded

Inflow Area = 10.109 ac, 71.42% Impervious, Inflow Depth > 4.43" for 10 Year event
Inflow = 42.01 cfs @ 12.16 hrs, Volume= 3.732 af
Outflow = 15.08 cfs @ 12.50 hrs, Volume= 2.275 af, Atten= 64%, Lag= 20.8 min
Primary = 9.22 cfs @ 12.50 hrs, Volume= 2.105 af
Secondary = 5.86 cfs @ 12.50 hrs, Volume= 0.170 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 46.78' @ 12.50 hrs Surf.Area= 21,240 sf Storage= 83,438 cf
Flood Elev= 48.00' Surf.Area= 23,557 sf Storage= 110,845 cf

Plug-Flow detention time= 226.3 min calculated for 2.275 af (61% of inflow)
Center-of-Mass det. time= 125.2 min (916.2 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	39.05'	110,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
39.05	9,855	0.0	0	0
41.35	9,855	30.0	6,800	6,800
42.00	9,855	45.0	2,883	9,683
43.00	11,943	100.0	10,899	20,582
44.00	14,202	100.0	13,073	33,654
45.00	16,891	100.0	15,547	49,201
46.00	19,752	100.0	18,322	67,522
47.00	21,668	100.0	20,710	88,232
48.00	23,557	100.0	22,613	110,845

Device	Routing	Invert	Outlet Devices
#1	Primary	41.35'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.35' / 41.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	41.35'	**3.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	45.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	46.00'	**4.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#5	Device 1	47.00'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600 Limited to weir flow at low heads
#6	Secondary	46.50'	**15.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=9.22 cfs @ 12.50 hrs HW=46.78' TW=38.77' (Dynamic Tailwater)
└─**1=Culvert** (Passes 9.22 cfs of 18.40 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.74 cfs @ 11.06 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.30 cfs @ 6.19 fps)
  ├─**4=Sharp-Crested Rectangular Weir** (Orifice Controls 8.17 cfs @ 4.19 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=5.85 cfs @ 12.50 hrs HW=46.78' TW=38.77' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 5.85 cfs @ 1.41 fps)

Summary for Pond POND 1.1: GRAVEL WETLAND 2

Inflow Area = 3.614 ac, 30.68% Impervious, Inflow Depth > 3.21" for 10 Year event
Inflow = 12.40 cfs @ 12.12 hrs, Volume= 0.966 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 54.11' @ 24.00 hrs Surf.Area= 14,115 sf Storage= 42,049 cf
Flood Elev= 57.00' Surf.Area= 21,643 sf Storage= 94,743 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	47.55'	117,304 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.55	6,269	0.0	0	0
49.85	6,269	30.0	4,326	4,326
50.50	6,269	45.0	1,834	6,159
51.00	7,199	100.0	3,367	9,526
52.00	9,187	100.0	8,193	17,719
53.00	11,345	100.0	10,266	27,985
54.00	13,814	100.0	12,580	40,565
55.00	16,645	100.0	15,230	55,794
56.00	19,805	100.0	18,225	74,019
58.00	23,480	100.0	43,285	117,304

Device	Routing	Invert	Outlet Devices
#1	Primary	49.85'	**24.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.85' / 49.45' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	49.85'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	53.50'	**4.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	56.50'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.55' TW=55.07' (Dynamic Tailwater)
↑**1=Culvert** (Controls 0.00 cfs)
↑**2=Orifice/Grate** (Controls 0.00 cfs)
3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
4=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond POND 1.2: PDMH203

Inflow Area = 6.231 ac, 42.27% Impervious, Inflow Depth > 1.73" for 10 Year event
Inflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af
Outflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af, Atten= 0%, Lag= 0.0 min
Primary = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 50.72' @ 12.09 hrs
Flood Elev= 57.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.35'	**48.0" Round Culvert** L= 269.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 49.35' / 48.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=11.76 cfs @ 12.09 hrs HW=50.71' TW=48.76' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 11.76 cfs @ 3.13 fps)

Summary for Pond POND 1.3: OUTLET CULVERTS

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=12)
[62] Hint: Exceeded Reach REACH 1.0 OUTLET depth by 2.58' @ 23.95 hrs

Inflow Area = 30.477 ac, 37.69% Impervious, Inflow Depth > 2.34" for 10 Year event
Inflow = 31.34 cfs @ 12.51 hrs, Volume= 5.942 af
Outflow = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af, Atten= 0%, Lag= 1.3 min
Primary = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 38.77' @ 12.53 hrs Surf.Area= 8,870 sf Storage= 13,560 cf
Flood Elev= 43.50' Surf.Area= 95,977 sf Storage= 236,017 cf

Plug-Flow detention time= 56.2 min calculated for 5.642 af (95% of inflow)
Center-of-Mass det. time= 29.8 min (900.3 - 870.4)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	236,017 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.00	960	0	0
36.00	1,428	1,194	1,194
38.00	5,418	6,846	8,040
40.00	14,354	19,772	27,812
42.00	66,884	81,238	109,050
43.00	92,707	79,796	188,846
43.50	95,977	47,171	236,017

Device	Routing	Invert	Outlet Devices
#1	Primary	35.60'	**42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch CMP_Arch_1/2 42x29 X 3.00** L= 68.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.60' / 35.30' S= 0.0044 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf
#2	Secondary	43.00'	**143.1 deg x 18.0' long x 0.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=31.11 cfs @ 12.53 hrs HW=38.77' TW=38.65' (Dynamic Tailwater)
↑—**1=CMP_Arch_1/2 42x29** (Outlet Controls 31.11 cfs @ 1.55 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.04' TW=38.65' (Dynamic Tailwater)
↑—**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond POND 1.4: SEDIMENT BASIN 1.0

Inflow Area = 7.248 ac, 0.42% Impervious, Inflow Depth > 2.83" for 10 Year event
Inflow = 18.77 cfs @ 12.19 hrs, Volume= 1.708 af
Outflow = 0.68 cfs @ 17.24 hrs, Volume= 0.950 af, Atten= 96%, Lag= 303.1 min
Primary = 0.68 cfs @ 17.24 hrs, Volume= 0.950 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 44.15' Surf.Area= 18,132 sf Storage= 11,702 cf
Peak Elev= 45.79' @ 17.24 hrs Surf.Area= 29,244 sf Storage= 50,580 cf (38,878 cf above start)
Flood Elev= 48.50' Surf.Area= 38,802 sf Storage= 127,441 cf (115,739 cf above start)

Plug-Flow detention time= 356.9 min calculated for 0.681 af (40% of inflow)
Center-of-Mass det. time= 9.2 min (846.8 - 837.5)

Volume	Invert	Avail.Storage	Storage Description
#1	43.00'	127,441 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	1,000	0	0
44.00	17,117	9,059	9,059
46.00	30,657	47,774	56,833
47.00	35,879	33,268	90,101
48.00	38,802	37,341	127,441

Device	Routing	Invert	Outlet Devices
#1	Primary	42.75'	**12.0" Round Culvert** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 42.75' / 42.40' S= 0.0053 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	43.00'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	46.80'	**10.0" x 17.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	47.40'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.10 Width (feet) 8.00 14.60

Primary OutFlow Max=0.68 cfs @ 17.24 hrs HW=45.79' TW=38.65' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.68 cfs of 5.16 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.68 cfs @ 7.80 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=44.15' TW=35.04' (Dynamic Tailwater)
└**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Summary for Link LINK 1.0: PDMH203 TAILWATER

This link takes into account the tailwater condition in PDMH203 which the outlet of gravel wetland 2 connects. The purpose of this is to determine the effects of any surcharging caused by the tailwater of Hodgson Brook entering the structure. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.1 by 7.52' @ 0.00 hrs (23.95 cfs 41.618 af)

Inflow Area = 3.614 ac, 30.68% Impervious, Inflow Depth = 0.00" for 10 Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 25 Point manual elevation table, To= 0.00 hrs, dt= 1.00 hrs, feet =

55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07		

Summary for Link PA1: POINT OF ANALYSIS

This link takes into account the tailwater condition in roadside swale along Goose Bay Drive which the existing culverts discharge into. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.3 by 3.61' @ 0.00 hrs (92.51 cfs 60.023 af)

Inflow Area = 30.477 ac, 37.69% Impervious, Inflow Depth > 2.23" for 10 Year event
Inflow = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af
Primary = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 2 Point manual elevation table, To= 0.00 hrs, dt= 24.00 hrs, feet =

38.65	38.65

Summary for Link PA2: POINT OF ANALYSIS

Inflow Area = 1.133 ac, 53.76% Impervious, Inflow Depth > 4.11" for 10 Year event
Inflow = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af
Primary = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=440,332 sf 71.42% Impervious Runoff Depth>5.88"
Flow Length=933' Tc=11.4 min CN=90 Runoff=54.93 cfs 4.956 af

Subcatchment POST 1.1: WATERSHED Runoff Area=157,428 sf 30.68% Impervious Runoff Depth>4.53"
Flow Length=464' Tc=8.3 min CN=78 Runoff=17.44 cfs 1.365 af

Subcatchment POST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>5.54"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=15.85 cfs 1.209 af

Subcatchment POST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>4.50"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=16.75 cfs 2.583 af

Subcatchment POST 1.4: WATERSHED 1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>4.09"
Flow Length=585' Tc=13.5 min CN=74 Runoff=27.23 cfs 2.472 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>5.54"
Flow Length=758' Tc=5.0 min CN=87 Runoff=7.12 cfs 0.523 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.87' Max Vel=2.22 fps Inflow=15.85 cfs 1.209 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=8.65 cfs 1.202 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.10' Storage=90,424 cf Inflow=54.93 cfs 4.956 af
Primary=19.03 cfs 2.766 af Secondary=18.86 cfs 0.671 af Outflow=37.88 cfs 3.437 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=55.22' Storage=59,446 cf Inflow=17.44 cfs 1.365 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.94' Inflow=15.85 cfs 1.209 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=15.85 cfs 1.209 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.17' Storage=17,433 cf Inflow=57.33 cfs 8.292 af
Primary=56.26 cfs 7.985 af Secondary=0.00 cfs 0.000 af Outflow=56.26 cfs 7.985 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=46.65' Storage=77,792 cf Inflow=27.23 cfs 2.472 af
Primary=0.78 cfs 1.070 af Secondary=0.00 cfs 0.000 af Outflow=0.78 cfs 1.070 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=56.26 cfs 7.985 af
Primary=56.26 cfs 7.985 af

Link PA2: POINT OF ANALYSIS Inflow=7.12 cfs 0.523 af
Primary=7.12 cfs 0.523 af

Total Runoff Area = 31.609 ac Runoff Volume = 13.108 af Average Runoff Depth = 4.98"
61.73% Pervious = 19.513 ac 38.27% Impervious = 12.096 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=440,332 sf 71.42% Impervious Runoff Depth>7.25"
Flow Length=933' Tc=11.4 min CN=90 Runoff=66.89 cfs 6.105 af

Subcatchment POST 1.1: WATERSHED Runoff Area=157,428 sf 30.68% Impervious Runoff Depth>5.81"
Flow Length=464' Tc=8.3 min CN=78 Runoff=22.21 cfs 1.750 af

Subcatchment POST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>6.89"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=19.47 cfs 1.503 af

Subcatchment POST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>5.77"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=21.37 cfs 3.312 af

Subcatchment POST 1.4: WATERSHED 1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>5.33"
Flow Length=585' Tc=13.5 min CN=74 Runoff=35.32 cfs 3.218 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>6.89"
Flow Length=758' Tc=5.0 min CN=87 Runoff=8.76 cfs 0.651 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.92' Max Vel=2.24 fps Inflow=19.47 cfs 1.503 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=11.76 cfs 1.495 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.39' Storage=96,897 cf Inflow=66.89 cfs 6.105 af
Primary=19.58 cfs 3.347 af Secondary=33.37 cfs 1.209 af Outflow=52.94 cfs 4.556 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=56.11' Storage=76,209 cf Inflow=22.21 cfs 1.750 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=51.13' Inflow=19.47 cfs 1.503 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=19.47 cfs 1.503 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.58' Storage=22,150 cf Inflow=76.91 cfs 10.982 af
Primary=74.09 cfs 10.655 af Secondary=0.00 cfs 0.000 af Outflow=74.09 cfs 10.655 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=47.02' Storage=90,878 cf Inflow=35.32 cfs 3.218 af
Primary=2.39 cfs 1.619 af Secondary=0.00 cfs 0.000 af Outflow=2.39 cfs 1.619 af

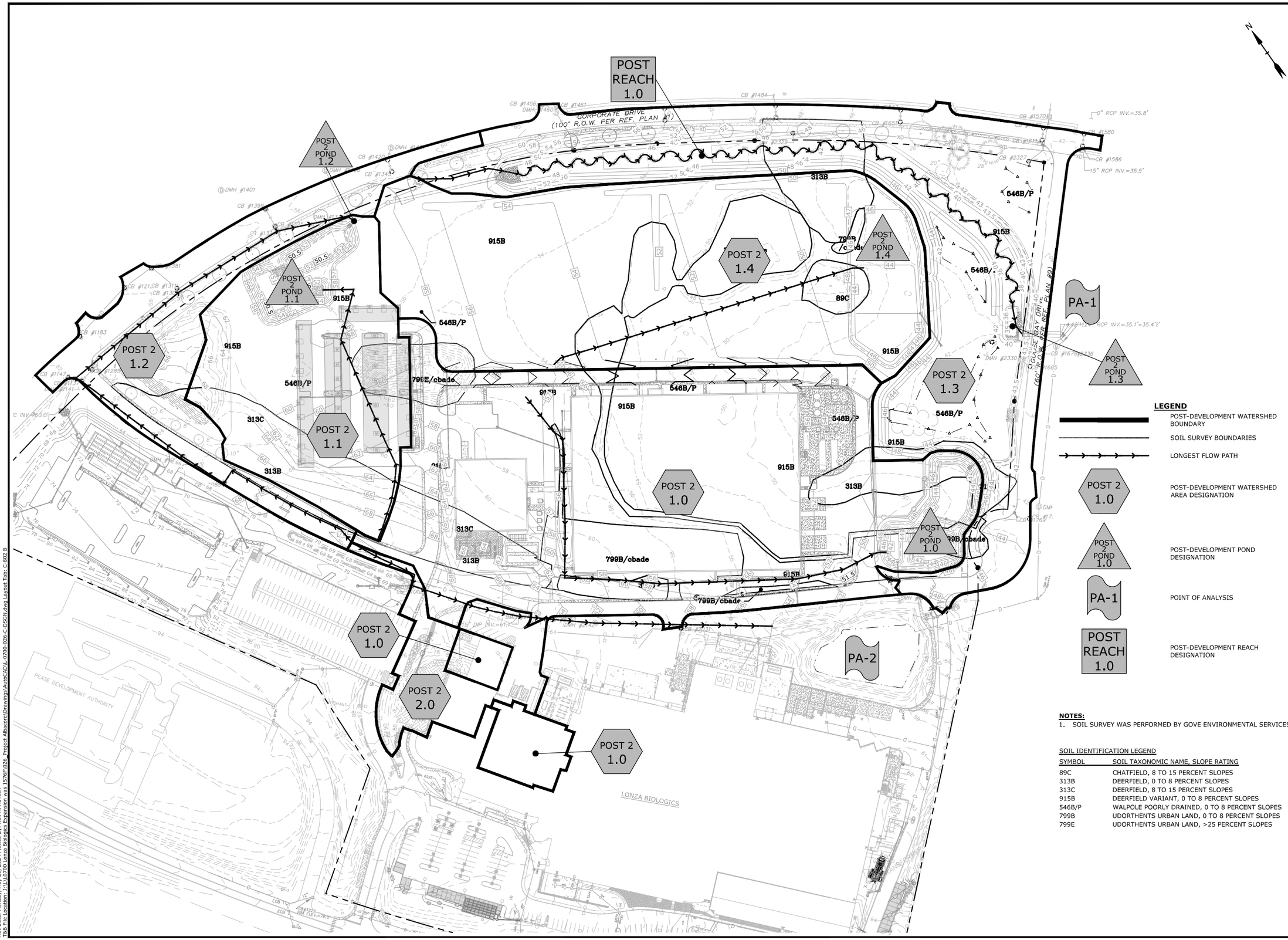
Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=74.09 cfs 10.655 af
Primary=74.09 cfs 10.655 af

Link PA2: POINT OF ANALYSIS Inflow=8.76 cfs 0.651 af
Primary=8.76 cfs 0.651 af

Total Runoff Area = 31.609 ac Runoff Volume = 16.539 af Average Runoff Depth = 6.28"
61.73% Pervious = 19.513 ac 38.27% Impervious = 12.096 ac

Phase 2 (2024 Amended) Post-Development Calculations



LEGEND

- POST-DEVELOPMENT WATERSHED BOUNDARY
- SOIL SURVEY BOUNDARIES
- LONGEST FLOW PATH
- POST-DEVELOPMENT WATERSHED AREA DESIGNATION (POST 2 1.0)
- POST-DEVELOPMENT POND DESIGNATION (POST 2 POND 1.0)
- POINT OF ANALYSIS (PA-1)
- POST-DEVELOPMENT REACH DESIGNATION (POST REACH 1.0)

SCALE IN FEET
0 80' 160'
GRAPHIC SCALE

NOTES:

1. SOIL SURVEY WAS PERFORMED BY GOVE ENVIRONMENTAL SERVICES.

SOIL IDENTIFICATION LEGEND

SYMBOL	SOIL TAXONOMIC NAME, SLOPE RATING
89C	CHATFIELD, 8 TO 15 PERCENT SLOPES
313B	DEERFIELD, 0 TO 8 PERCENT SLOPES
313C	DEERFIELD, 8 TO 15 PERCENT SLOPES
915B	DEERFIELD VARIANT, 0 TO 8 PERCENT SLOPES
546B/P	WALPOLE POORLY DRAINED, 0 TO 8 PERCENT SLOPES
799B	UDORTHENTS URBAN LAND, 0 TO 8 PERCENT SLOPES
799E	UDORTHENTS URBAN LAND, >25 PERCENT SLOPES

Tighe&Bond

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
Q	5/20/2024	Solar - Amended Approval
P	4/2/2024	Ph2 IFC Addendum #1
O	12/15/2023	Ph2 Issued for Construction
N	11/9/2023	Revised P.B. Submission
M	9/27/2023	P.B. Submission
L	9/1/2022	Issued for Construction
K	5/27/2022	Issued for Bid

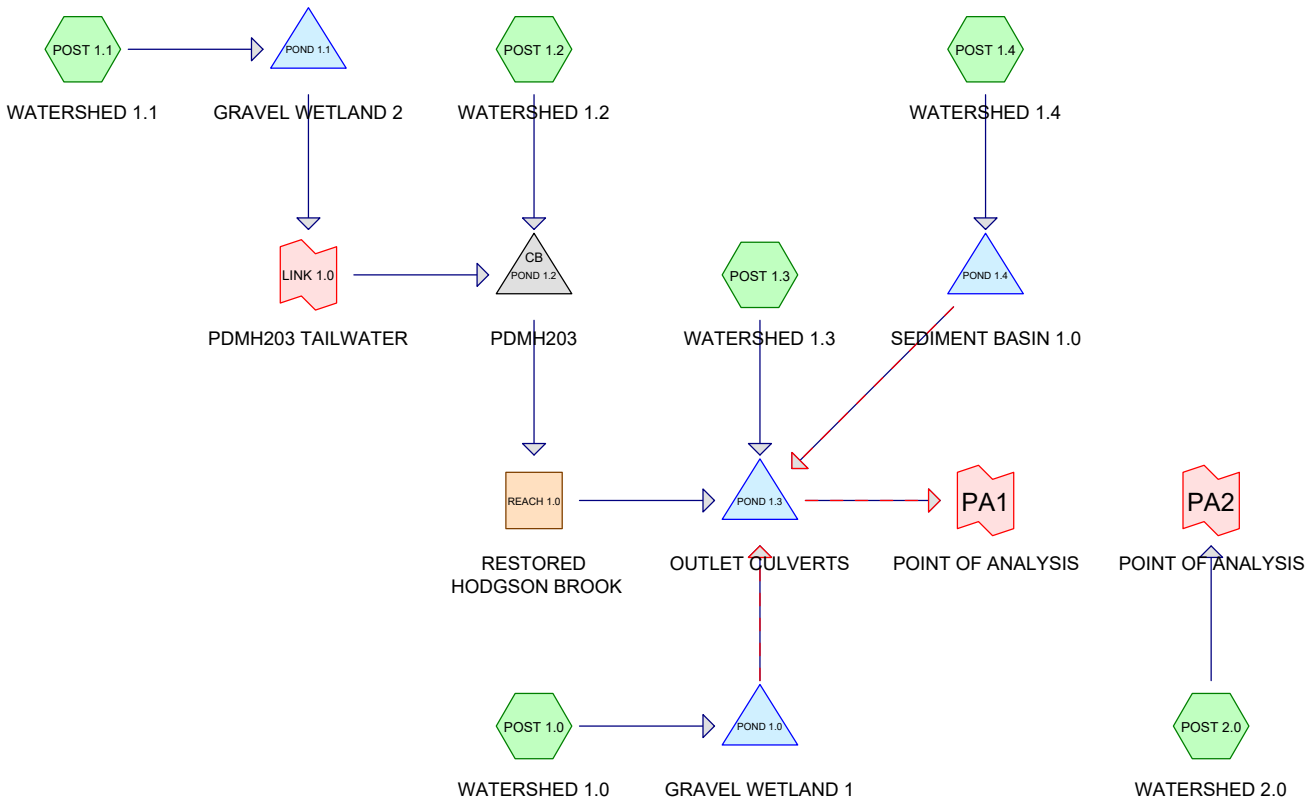
PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

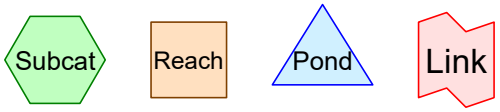
PHASE 2
POST-DEVELOPMENT
WATERSHED AREA PLAN

SCALE: AS SHOWN

C-802 B

Last Save Date: May 17, 2024 4:43 PM By: NAHANSEN
Plot Date: May 20, 2024 7:44 AM By: Nicholas Hansen
T&B File Location: J:\LL\L0700 Lonza Biologics Expansion was 1576F\026_Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-802 B





Routing Diagram for L-0700-26 POST P2
Prepared by Tighe & Bond Consulting, Printed 3/1/2024

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.312	61	>75% Grass cover, Good, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4)
13.542	74	>75% Grass cover, Good, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
1.467	80	>75% Grass cover, Good, HSG D (POST 1.0, POST 1.3, POST 1.4)
0.514	58	Meadow, non-grazed, HSG B (POST 1.3)
1.662	71	Meadow, non-grazed, HSG C (POST 1.3)
0.639	98	Paved parking, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3)
6.974	98	Paved parking, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
0.137	98	Paved parking, HSG D (POST 1.0, POST 1.3)
0.120	98	Roofs, HSG B (POST 1.0)
3.526	98	Roofs, HSG C (POST 1.0, POST 2.0)
0.714	98	Roofs, HSG D (POST 1.0)
31.609	**82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.586	HSG B	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4
25.705	HSG C	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0
2.318	HSG D	POST 1.0, POST 1.3, POST 1.4
0.000	Other	
31.609		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=440,332 sf 71.49% Impervious Runoff Depth>2.61"
Flow Length=933' Tc=11.4 min CN=90 Runoff=25.38 cfs 2.201 af

Subcatchment POST 1.1: WATERSHED Runoff Area=157,428 sf 30.92% Impervious Runoff Depth>1.63"
Flow Length=464' Tc=8.3 min CN=78 Runoff=6.25 cfs 0.492 af

Subcatchment POST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>2.34"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=6.94 cfs 0.511 af

Subcatchment POST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>1.62"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=5.96 cfs 0.929 af

Subcatchment POST 1.4: WATERSHED 1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>1.36"
Flow Length=585' Tc=13.5 min CN=74 Runoff=8.76 cfs 0.822 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>2.34"
Flow Length=758' Tc=5.0 min CN=87 Runoff=3.10 cfs 0.221 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.63' Max Vel=2.08 fps Inflow=6.94 cfs 0.511 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=4.97 cfs 0.507 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.02' Storage=67,987 cf Inflow=25.38 cfs 2.201 af
Primary=0.96 cfs 0.874 af Secondary=0.00 cfs 0.000 af Outflow=0.96 cfs 0.874 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=52.38' Storage=21,415 cf Inflow=6.25 cfs 0.492 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.38' Inflow=6.94 cfs 0.511 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=6.94 cfs 0.511 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.16' Storage=8,981 cf Inflow=9.25 cfs 3.060 af
Primary=9.25 cfs 2.856 af Secondary=0.00 cfs 0.000 af Outflow=9.25 cfs 2.856 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=44.62' Storage=21,007 cf Inflow=8.76 cfs 0.822 af
Primary=0.51 cfs 0.751 af Secondary=0.00 cfs 0.000 af Outflow=0.51 cfs 0.751 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=9.25 cfs 2.856 af
Primary=9.25 cfs 2.856 af

Link PA2: POINT OF ANALYSIS Inflow=3.10 cfs 0.221 af
Primary=3.10 cfs 0.221 af

Total Runoff Area = 31.609 ac Runoff Volume = 5.176 af Average Runoff Depth = 1.96"
61.68% Pervious = 19.497 ac 38.32% Impervious = 12.112 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=440,332 sf 71.49% Impervious Runoff Depth>4.43"
Flow Length=933' Tc=11.4 min CN=90 Runoff=42.01 cfs 3.732 af

Subcatchment POST 1.1: WATERSHED Runoff Area=157,428 sf 30.92% Impervious Runoff Depth>3.21"
Flow Length=464' Tc=8.3 min CN=78 Runoff=12.40 cfs 0.966 af

Subcatchment POST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>4.11"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=11.94 cfs 0.897 af

Subcatchment POST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>3.18"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=11.87 cfs 1.826 af

Subcatchment POST 1.4: WATERSHED 1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>2.83"
Flow Length=585' Tc=13.5 min CN=74 Runoff=18.77 cfs 1.708 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>4.11"
Flow Length=758' Tc=5.0 min CN=87 Runoff=5.36 cfs 0.388 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.82' Max Vel=2.20 fps Inflow=11.94 cfs 0.897 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=6.12 cfs 0.891 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.78' Storage=83,438 cf Inflow=42.01 cfs 3.732 af
Primary=9.22 cfs 2.105 af Secondary=5.86 cfs 0.170 af Outflow=15.08 cfs 2.275 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=54.11' Storage=42,049 cf Inflow=12.40 cfs 0.966 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.72' Inflow=11.94 cfs 0.897 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=11.94 cfs 0.897 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.77' Storage=13,560 cf Inflow=31.34 cfs 5.942 af
Primary=31.22 cfs 5.655 af Secondary=0.00 cfs 0.000 af Outflow=31.22 cfs 5.655 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=45.79' Storage=50,580 cf Inflow=18.77 cfs 1.708 af
Primary=0.68 cfs 0.950 af Secondary=0.00 cfs 0.000 af Outflow=0.68 cfs 0.950 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=31.22 cfs 5.655 af
Primary=31.22 cfs 5.655 af

Link PA2: POINT OF ANALYSIS Inflow=5.36 cfs 0.388 af
Primary=5.36 cfs 0.388 af

Total Runoff Area = 31.609 ac Runoff Volume = 9.517 af Average Runoff Depth = 3.61"
61.68% Pervious = 19.497 ac 38.32% Impervious = 12.112 ac

Summary for Subcatchment POST 1.0: WATERSHED 1.0

[47] Hint: Peak is 1668% of capacity of segment #4
[47] Hint: Peak is 1668% of capacity of segment #5
[47] Hint: Peak is 920% of capacity of segment #6
[47] Hint: Peak is 566% of capacity of segment #7
[47] Hint: Peak is 566% of capacity of segment #8
[47] Hint: Peak is 120% of capacity of segment #9
[47] Hint: Peak is 4305% of capacity of segment #10

Runoff = 42.01 cfs @ 12.16 hrs, Volume= 3.732 af, Depth> 4.43"
Routed to Pond POND 1.0 : GRAVEL WETLAND 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
5,235	98	Roofs, HSG B
29,148	61	>75% Grass cover, Good, HSG B
18,966	98	Paved parking, HSG B
143,455	98	Roofs, HSG C
81,718	74	>75% Grass cover, Good, HSG C
110,540	98	Paved parking, HSG C
31,119	98	Roofs, HSG D
14,671	80	>75% Grass cover, Good, HSG D
5,480	98	Paved parking, HSG D
440,332	90	Weighted Average
125,537		28.51% Pervious Area
314,795		71.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.2	32	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	19	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	162	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.4	84	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.5	113	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
1.2	299	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.4	94	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.1	46	0.0240	11.16	35.05	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
0.0	5	0.0800	7.16	0.98	**Pipe Channel,** 5.0" Round Area= 0.1 sf Perim= 1.3' r= 0.10' n= 0.013
0.0	9	0.0110	9.90	69.95	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
11.4	933	Total			

Summary for Subcatchment POST 1.1: WATERSHED 1.1

Runoff = 12.40 cfs @ 12.12 hrs, Volume= 0.966 af, Depth> 3.21"
Routed to Pond POND 1.1 : GRAVEL WETLAND 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
36,403	61	>75% Grass cover, Good, HSG B
3,210	98	Paved parking, HSG B
72,351	74	>75% Grass cover, Good, HSG C
45,464	98	Paved parking, HSG C
157,428	78	Weighted Average
108,754		69.08% Pervious Area
48,674		30.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	100	0.0625	0.29		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
2.2	312	0.0220	2.39		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.3	33	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	19	0.3300	8.62		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
8.3	464	Total			

Summary for Subcatchment POST 1.2: WATERSHED 1.2

[47] Hint: Peak is 437% of capacity of segment #3
[47] Hint: Peak is 261% of capacity of segment #4
[47] Hint: Peak is 161% of capacity of segment #5

Runoff = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af, Depth> 4.11"
Routed to Pond POND 1.2 : PDMH203

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
9,848	61	>75% Grass cover, Good, HSG B
4,784	98	Paved parking, HSG B
37,701	74	>75% Grass cover, Good, HSG C
61,646	98	Paved parking, HSG C
113,979	87	Weighted Average
47,549		41.72% Pervious Area
66,430		58.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0100	1.12		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.0	153	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	343	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	13	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.8	453	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
0.4	129	0.0050	5.91	29.00	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Corrugated PE, smooth interior

6.4 1,191 Total

Summary for Subcatchment POST 1.3: WATERSHED 1.3

Runoff = 11.87 cfs @ 12.63 hrs, Volume= 1.826 af, Depth> 3.18"
Routed to Pond POND 1.3 : OUTLET CULVERTS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
1,830	61	>75% Grass cover, Good, HSG B
22,404	58	Meadow, non-grazed, HSG B
896	98	Paved parking, HSG B
131,991	74	>75% Grass cover, Good, HSG C
68,446	98	Paved parking, HSG C
72,396	71	Meadow, non-grazed, HSG C
1,638	80	>75% Grass cover, Good, HSG D
499	98	Paved parking, HSG D
300,100	78	Weighted Average
230,259		76.73% Pervious Area
69,841		23.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0130	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.1	52	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	27	0.2720	7.82		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
33.8	1,346	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
45.9	1,525	Total			

Summary for Subcatchment POST 1.4: WATERSHED 1.4

Runoff = 18.77 cfs @ 12.19 hrs, Volume= 1.708 af, Depth> 2.83"
Routed to Pond POND 1.4 : SEDIMENT BASIN 1.0

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
23,477	61	>75% Grass cover, Good, HSG B
243,330	74	>75% Grass cover, Good, HSG C
1,334	98	Paved parking, HSG C
47,586	80	>75% Grass cover, Good, HSG D
0	96	Gravel surface, HSG D
315,727	74	Weighted Average
314,393		99.58% Pervious Area
1,334		0.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0245	0.20		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
5.1	465	0.0103	1.52		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	20	0.3300	8.62		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
13.5	585	Total			

Summary for Subcatchment POST 2.0: WATERSHED 2.0

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af, Depth> 4.11"
Routed to Link PA2 : POINT OF ANALYSIS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
10,145	98	Roofs, HSG C
22,815	74	>75% Grass cover, Good, HSG C
16,376	98	Paved parking, HSG C
49,336	87	Weighted Average
22,815		46.24% Pervious Area
26,521		53.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0164	1.36		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.3	48	0.0164	2.60		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	130	0.0140	7.03	12.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.5	70	0.0250	2.37		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.3	410	0.0050	5.09	16.00	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50'

n= 0.013

3.6 758 Total, Increased to minimum Tc = 5.0 min

Summary for Reach REACH 1.0: RESTORED HODGSON BROOK

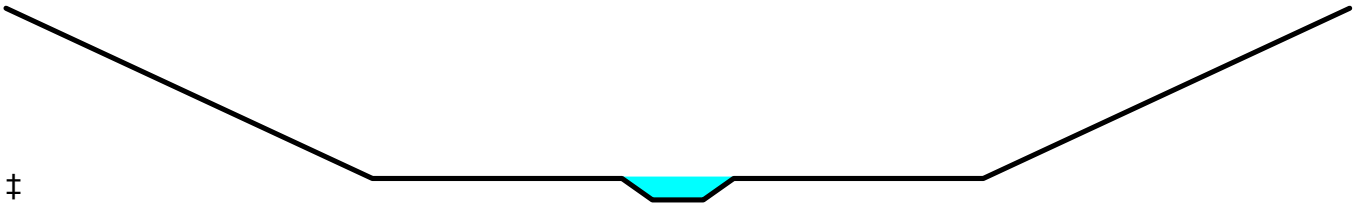
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

Inflow Area = 6.231 ac, 42.41% Impervious, Inflow Depth > 1.73" for 10 Year event
Inflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af
Outflow = 6.12 cfs @ 12.86 hrs, Volume= 0.891 af, Atten= 49%, Lag= 45.9 min
Routed to Pond POND 1.3 : OUTLET CULVERTS

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.20 fps, Min. Travel Time= 9.9 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 25.6 min

Peak Storage= 6,846 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.82' , Surface Width= 30.44'
Bank-Full Depth= 6.75' Flow Area= 291.0 sf, Capacity= 2,720.29 cfs

Custom cross-section, Length= 1,309.0' Slope= 0.0092 '/' (101 Elevation Intervals)
Constant n= 0.040 Winding stream, pools & shoals
Inlet Invert= 48.00', Outlet Invert= 36.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	12.00	0.00
18.00	6.00	6.00
30.25	6.00	6.00
31.75	5.25	6.75
34.25	5.25	6.75
35.75	6.00	6.00
48.00	6.00	6.00
66.00	12.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Width (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	2.5	0.0	0	0.00
0.75	3.0	30.4	30.0	3,927	2.28
6.75	291.0	68.3	66.0	380,919	2,720.29

Summary for Pond POND 1.0: GRAVEL WETLAND 1

[95] Warning: Outlet Device #4 rise exceeded

Inflow Area = 10.109 ac, 71.49% Impervious, Inflow Depth > 4.43" for 10 Year event
Inflow = 42.01 cfs @ 12.16 hrs, Volume= 3.732 af
Outflow = 15.08 cfs @ 12.50 hrs, Volume= 2.275 af, Atten= 64%, Lag= 20.8 min
Primary = 9.22 cfs @ 12.50 hrs, Volume= 2.105 af
Routed to Pond POND 1.3 : OUTLET CULVERTS
Secondary = 5.86 cfs @ 12.50 hrs, Volume= 0.170 af
Routed to Pond POND 1.3 : OUTLET CULVERTS

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 46.78' @ 12.50 hrs Surf.Area= 21,240 sf Storage= 83,438 cf
Flood Elev= 48.00' Surf.Area= 23,557 sf Storage= 110,845 cf

Plug-Flow detention time= 226.3 min calculated for 2.275 af (61% of inflow)
Center-of-Mass det. time= 125.2 min (916.2 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1	39.05'	110,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
39.05	9,855	0.0	0	0
41.35	9,855	30.0	6,800	6,800
42.00	9,855	45.0	2,883	9,683
43.00	11,943	100.0	10,899	20,582
44.00	14,202	100.0	13,073	33,654
45.00	16,891	100.0	15,547	49,201
46.00	19,752	100.0	18,322	67,522
47.00	21,668	100.0	20,710	88,232
48.00	23,557	100.0	22,613	110,845

Device	Routing	Invert	Outlet Devices
#1	Primary	41.35'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.35' / 41.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	41.35'	**3.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	45.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	46.00'	**4.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#5	Device 1	47.00'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600 Limited to weir flow at low heads
#6	Secondary	46.50'	**15.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=9.22 cfs @ 12.50 hrs HW=46.78' TW=38.77' (Dynamic Tailwater)
- **1=Culvert** (Passes 9.22 cfs of 18.40 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.74 cfs @ 11.06 fps)
  - **3=Orifice/Grate** (Orifice Controls 0.30 cfs @ 6.19 fps)
  - **4=Sharp-Crested Rectangular Weir** (Orifice Controls 8.17 cfs @ 4.19 fps)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=5.85 cfs @ 12.50 hrs HW=46.78' TW=38.77' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Weir Controls 5.85 cfs @ 1.41 fps)

Summary for Pond POND 1.1: GRAVEL WETLAND 2

Inflow Area = 3.614 ac, 30.92% Impervious, Inflow Depth > 3.21" for 10 Year event
Inflow = 12.40 cfs @ 12.12 hrs, Volume= 0.966 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link LINK 1.0 : PDMH203 TAILWATER

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 54.11' @ 24.00 hrs Surf.Area= 14,115 sf Storage= 42,049 cf
Flood Elev= 57.00' Surf.Area= 21,643 sf Storage= 94,743 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	47.55'	117,304 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.55	6,269	0.0	0	0
49.85	6,269	30.0	4,326	4,326
50.50	6,269	45.0	1,834	6,159
51.00	7,199	100.0	3,367	9,526
52.00	9,187	100.0	8,193	17,719
53.00	11,345	100.0	10,266	27,985
54.00	13,814	100.0	12,580	40,565
55.00	16,645	100.0	15,230	55,794
56.00	19,805	100.0	18,225	74,019
58.00	23,480	100.0	43,285	117,304

Device	Routing	Invert	Outlet Devices
#1	Primary	49.85'	**24.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.85' / 49.45' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	49.85'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	53.50'	**4.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	56.50'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600

Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.55' TW=55.07' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond POND 1.2: PDMH203

Inflow Area = 6.231 ac, 42.41% Impervious, Inflow Depth > 1.73" for 10 Year event
Inflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af
Outflow = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af, Atten= 0%, Lag= 0.0 min
Primary = 11.94 cfs @ 12.09 hrs, Volume= 0.897 af
Routed to Reach REACH 1.0 : RESTORED HODGSON BROOK

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 50.72' @ 12.09 hrs
Flood Elev= 57.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.35'	**48.0" Round Culvert** L= 269.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 49.35' / 48.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=11.76 cfs @ 12.09 hrs HW=50.71' TW=48.76' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 11.76 cfs @ 3.13 fps)

Summary for Pond POND 1.3: OUTLET CULVERTS

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=12)
[62] Hint: Exceeded Reach REACH 1.0 OUTLET depth by 2.58' @ 23.95 hrs

Inflow Area = 30.477 ac, 37.74% Impervious, Inflow Depth > 2.34" for 10 Year event
Inflow = 31.34 cfs @ 12.51 hrs, Volume= 5.942 af
Outflow = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af, Atten= 0%, Lag= 1.3 min
Primary = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af
Routed to Link PA1 : POINT OF ANALYSIS
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link PA1 : POINT OF ANALYSIS

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 38.77' @ 12.53 hrs Surf.Area= 8,870 sf Storage= 13,560 cf
Flood Elev= 43.50' Surf.Area= 95,977 sf Storage= 236,017 cf

Plug-Flow detention time= 56.2 min calculated for 5.642 af (95% of inflow)
Center-of-Mass det. time= 29.8 min (900.3 - 870.4)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	236,017 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.00	960	0	0
36.00	1,428	1,194	1,194
38.00	5,418	6,846	8,040
40.00	14,354	19,772	27,812
42.00	66,884	81,238	109,050
43.00	92,707	79,796	188,846
43.50	95,977	47,171	236,017

Device	Routing	Invert	Outlet Devices
#1	Primary	35.60'	**42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch CMP_Arch_1/2 42x29 X 3.00** L= 68.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.60' / 35.30' S= 0.0044 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf
#2	Secondary	43.00'	**143.1 deg x 18.0' long x 0.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=31.11 cfs @ 12.53 hrs HW=38.77' TW=38.65' (Dynamic Tailwater)
↑—**1=CMP_Arch_1/2 42x29** (Outlet Controls 31.11 cfs @ 1.55 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.04' TW=38.65' (Dynamic Tailwater)
↑—**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Summary for Pond POND 1.4: SEDIMENT BASIN 1.0

Inflow Area = 7.248 ac, 0.42% Impervious, Inflow Depth > 2.83" for 10 Year event
Inflow = 18.77 cfs @ 12.19 hrs, Volume= 1.708 af
Outflow = 0.68 cfs @ 17.24 hrs, Volume= 0.950 af, Atten= 96%, Lag= 303.1 min
Primary = 0.68 cfs @ 17.24 hrs, Volume= 0.950 af
Routed to Pond POND 1.3 : OUTLET CULVERTS
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond POND 1.3 : OUTLET CULVERTS

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Starting Elev= 44.15' Surf.Area= 18,132 sf Storage= 11,702 cf
Peak Elev= 45.79' @ 17.24 hrs Surf.Area= 29,244 sf Storage= 50,580 cf (38,878 cf above start)
Flood Elev= 48.50' Surf.Area= 38,802 sf Storage= 127,441 cf (115,739 cf above start)

Plug-Flow detention time= 356.2 min calculated for 0.680 af (40% of inflow)
Center-of-Mass det. time= 9.2 min (846.8 - 837.5)

Volume	Invert	Avail.Storage	Storage Description
#1	43.00'	127,441 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	1,000	0	0
44.00	17,117	9,059	9,059
46.00	30,657	47,774	56,833
47.00	35,879	33,268	90,101
48.00	38,802	37,341	127,441

Device	Routing	Invert	Outlet Devices
#1	Primary	42.75'	**12.0" Round Culvert** L= 66.0' Ke= 0.500 Inlet / Outlet Invert= 42.75' / 42.40' S= 0.0053 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	43.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	46.80'	**10.0" x 17.5" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	47.40'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.10 Width (feet) 8.00 14.60

Primary OutFlow Max=0.68 cfs @ 17.24 hrs HW=45.79' TW=38.65' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.68 cfs of 5.16 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.68 cfs @ 7.80 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=44.15' TW=35.04' (Dynamic Tailwater)
↑**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Summary for Link LINK 1.0: PDMH203 TAILWATER

This link takes into account the tailwater condition in PDMH203 which the outlet of gravel wetland 2 connects. The purpose of this is to determine the effects of any surcharging caused by the tailwater of Hodgson Brook entering the structure. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.1 by 7.52' @ 0.00 hrs (23.95 cfs 41.618 af)

Inflow Area = 3.614 ac, 30.92% Impervious, Inflow Depth = 0.00" for 10 Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Routed to Pond POND 1.2 : PDMH203

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 25 Point manual elevation table, To= 0.00 hrs, dt= 1.00 hrs, feet =

55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07		

Summary for Link PA1: POINT OF ANALYSIS

This link takes into account the tailwater condition in roadside swale along Goose Bay Drive which the existing culverts discharge into. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.3 by 3.61' @ 0.00 hrs (92.51 cfs 60.023 af)

Inflow Area = 30.477 ac, 37.74% Impervious, Inflow Depth > 2.23" for 10 Year event
Inflow = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af
Primary = 31.22 cfs @ 12.53 hrs, Volume= 5.655 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 2 Point manual elevation table, To= 0.00 hrs, dt= 24.00 hrs, feet =
38.65 38.65

Summary for Link PA2: POINT OF ANALYSIS

Inflow Area = 1.133 ac, 53.76% Impervious, Inflow Depth > 4.11" for 10 Year event
Inflow = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af
Primary = 5.36 cfs @ 12.07 hrs, Volume= 0.388 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=440,332 sf 71.49% Impervious Runoff Depth>5.88"
Flow Length=933' Tc=11.4 min CN=90 Runoff=54.93 cfs 4.956 af

Subcatchment POST 1.1: WATERSHED Runoff Area=157,428 sf 30.92% Impervious Runoff Depth>4.53"
Flow Length=464' Tc=8.3 min CN=78 Runoff=17.44 cfs 1.365 af

Subcatchment POST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>5.54"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=15.85 cfs 1.209 af

Subcatchment POST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>4.50"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=16.75 cfs 2.583 af

Subcatchment POST 1.4: WATERSHED 1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>4.09"
Flow Length=585' Tc=13.5 min CN=74 Runoff=27.23 cfs 2.472 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>5.54"
Flow Length=758' Tc=5.0 min CN=87 Runoff=7.12 cfs 0.523 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.87' Max Vel=2.22 fps Inflow=15.85 cfs 1.209 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=8.65 cfs 1.202 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.10' Storage=90,424 cf Inflow=54.93 cfs 4.956 af
Primary=19.03 cfs 2.766 af Secondary=18.86 cfs 0.671 af Outflow=37.88 cfs 3.437 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=55.22' Storage=59,446 cf Inflow=17.44 cfs 1.365 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=50.94' Inflow=15.85 cfs 1.209 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=15.85 cfs 1.209 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.17' Storage=17,433 cf Inflow=57.33 cfs 8.292 af
Primary=56.26 cfs 7.985 af Secondary=0.00 cfs 0.000 af Outflow=56.26 cfs 7.985 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=46.65' Storage=77,792 cf Inflow=27.23 cfs 2.472 af
Primary=0.78 cfs 1.070 af Secondary=0.00 cfs 0.000 af Outflow=0.78 cfs 1.070 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=56.26 cfs 7.985 af
Primary=56.26 cfs 7.985 af

Link PA2: POINT OF ANALYSIS Inflow=7.12 cfs 0.523 af
Primary=7.12 cfs 0.523 af

Total Runoff Area = 31.609 ac Runoff Volume = 13.108 af Average Runoff Depth = 4.98"
61.68% Pervious = 19.497 ac 38.32% Impervious = 12.112 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=440,332 sf 71.49% Impervious Runoff Depth>7.25"
Flow Length=933' Tc=11.4 min CN=90 Runoff=66.89 cfs 6.105 af

Subcatchment POST 1.1: WATERSHED Runoff Area=157,428 sf 30.92% Impervious Runoff Depth>5.81"
Flow Length=464' Tc=8.3 min CN=78 Runoff=22.21 cfs 1.750 af

Subcatchment POST 1.2: WATERSHED Runoff Area=113,979 sf 58.28% Impervious Runoff Depth>6.89"
Flow Length=1,191' Tc=6.4 min CN=87 Runoff=19.47 cfs 1.503 af

Subcatchment POST 1.3: WATERSHED Runoff Area=300,100 sf 23.27% Impervious Runoff Depth>5.77"
Flow Length=1,525' Tc=45.9 min CN=78 Runoff=21.37 cfs 3.312 af

Subcatchment POST 1.4: WATERSHED 1.4 Runoff Area=315,727 sf 0.42% Impervious Runoff Depth>5.33"
Flow Length=585' Tc=13.5 min CN=74 Runoff=35.32 cfs 3.218 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,336 sf 53.76% Impervious Runoff Depth>6.89"
Flow Length=758' Tc=5.0 min CN=87 Runoff=8.76 cfs 0.651 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.92' Max Vel=2.24 fps Inflow=19.47 cfs 1.503 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=11.76 cfs 1.495 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.39' Storage=96,897 cf Inflow=66.89 cfs 6.105 af
Primary=19.58 cfs 3.347 af Secondary=33.37 cfs 1.209 af Outflow=52.94 cfs 4.556 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=56.11' Storage=76,209 cf Inflow=22.21 cfs 1.750 af
Outflow=0.00 cfs 0.000 af

Pond POND 1.2: PDMH203 Peak Elev=51.13' Inflow=19.47 cfs 1.503 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=19.47 cfs 1.503 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.58' Storage=22,150 cf Inflow=76.91 cfs 10.982 af
Primary=74.09 cfs 10.655 af Secondary=0.00 cfs 0.000 af Outflow=74.09 cfs 10.655 af

Pond POND 1.4: SEDIMENT BASIN 1.0 Peak Elev=47.02' Storage=90,878 cf Inflow=35.32 cfs 3.218 af
Primary=2.39 cfs 1.619 af Secondary=0.00 cfs 0.000 af Outflow=2.39 cfs 1.619 af

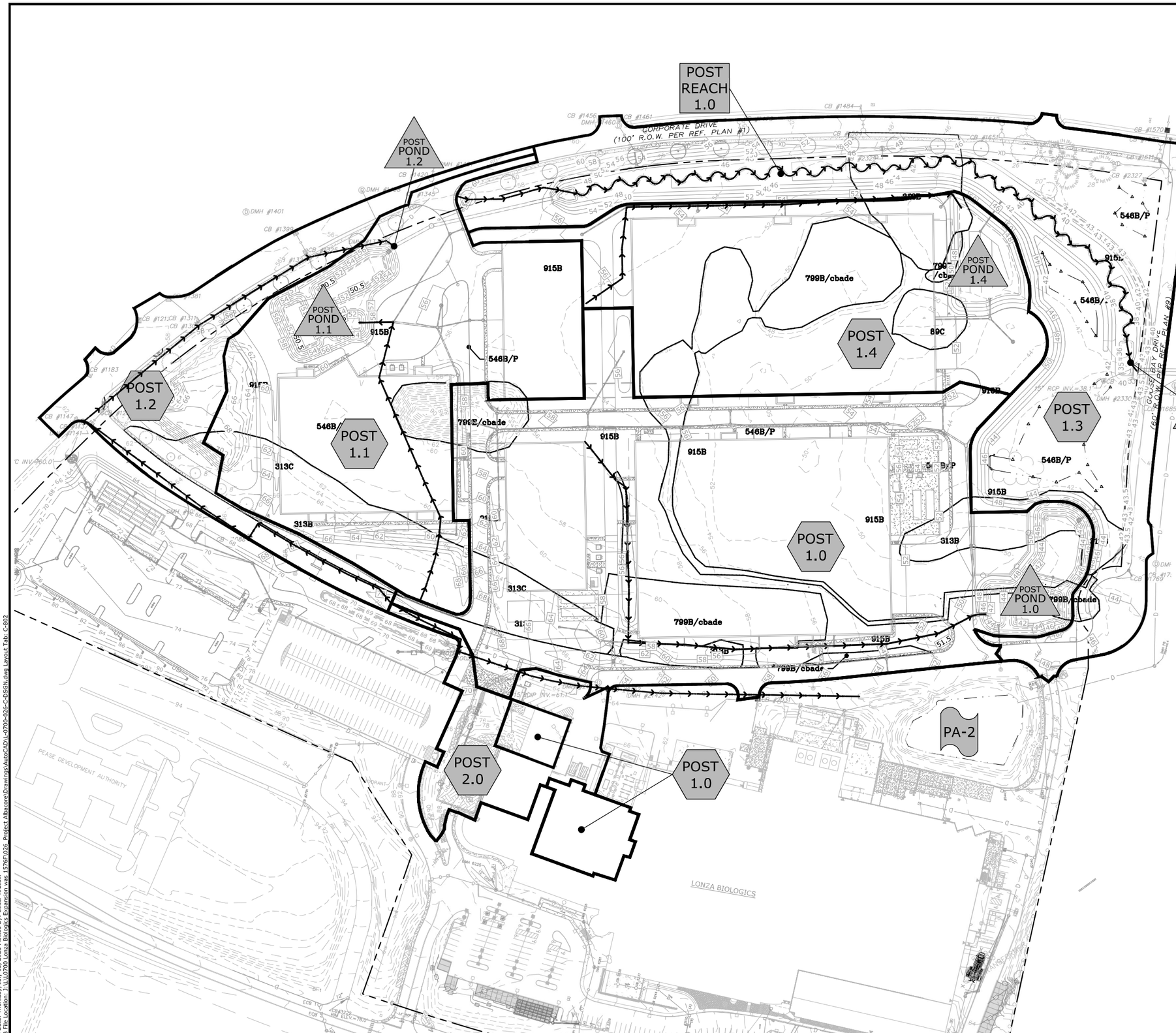
Link LINK 1.0: PDMH203 TAILWATER Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Link PA1: POINT OF ANALYSIS Inflow=74.09 cfs 10.655 af
Primary=74.09 cfs 10.655 af

Link PA2: POINT OF ANALYSIS Inflow=8.76 cfs 0.651 af
Primary=8.76 cfs 0.651 af

Total Runoff Area = 31.609 ac Runoff Volume = 16.539 af Average Runoff Depth = 6.28"
61.68% Pervious = 19.497 ac 38.32% Impervious = 12.112 ac

Master Post-Development Calculations



LEGEND

- POST-DEVELOPMENT WATERSHED BOUNDARY
- SOIL SURVEY BOUNDARIES
- LONGEST FLOW PATH
- POST 1.0 — POST-DEVELOPMENT WATERSHED AREA DESIGNATION
- POST POND 1 — POST-DEVELOPMENT POND DESIGNATION
- PA-1 — POINT OF ANALYSIS
- POST REACH 1 — POST-DEVELOPMENT REACH DESIGNATION

SCALE IN FEET
0 80' 160'
GRAPHIC SCALE

NOTES:

1. SOIL SURVEY WAS PERFORMED BY GOVE ENVIRONMENTAL SERVICES.

SOIL IDENTIFICATION LEGEND

SYMBOL	SOIL TAXONOMIC NAME, SLOPE RATING
89C	CHATFIELD, 8 TO 15 PERCENT SLOPES
313B	DEERFIELD, 0 TO 8 PERCENT SLOPES
313C	DEERFIELD, 8 TO 15 PERCENT SLOPES
915B	DEERFIELD VARIANT, 0 TO 8 PERCENT SLOPES
546B/P	WALPOLE POORLY DRAINED, 0 TO 8 PERCENT SLOPES
799B	UDORTHENTS URBAN LAND, 0 TO 8 PERCENT SLOPES
799E	UDORTHENTS URBAN LAND, >25 PERCENT SLOPES

Tighe&Bond

Proposed Industrial Development

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
L	7/17/2023	Amended Site Plan Review
K	5/5/2023	Phase 1B Issued for Bid
J	3/15/2023	Phase 1B Issued for Preliminary Pricing
I	1/9/2023	Admin. Approval Submission
H	12/10/2021	Planning Board Stipulation
G	8/19/2019	Admin. Approval Submission
F	11/6/2018	P.B. Submission

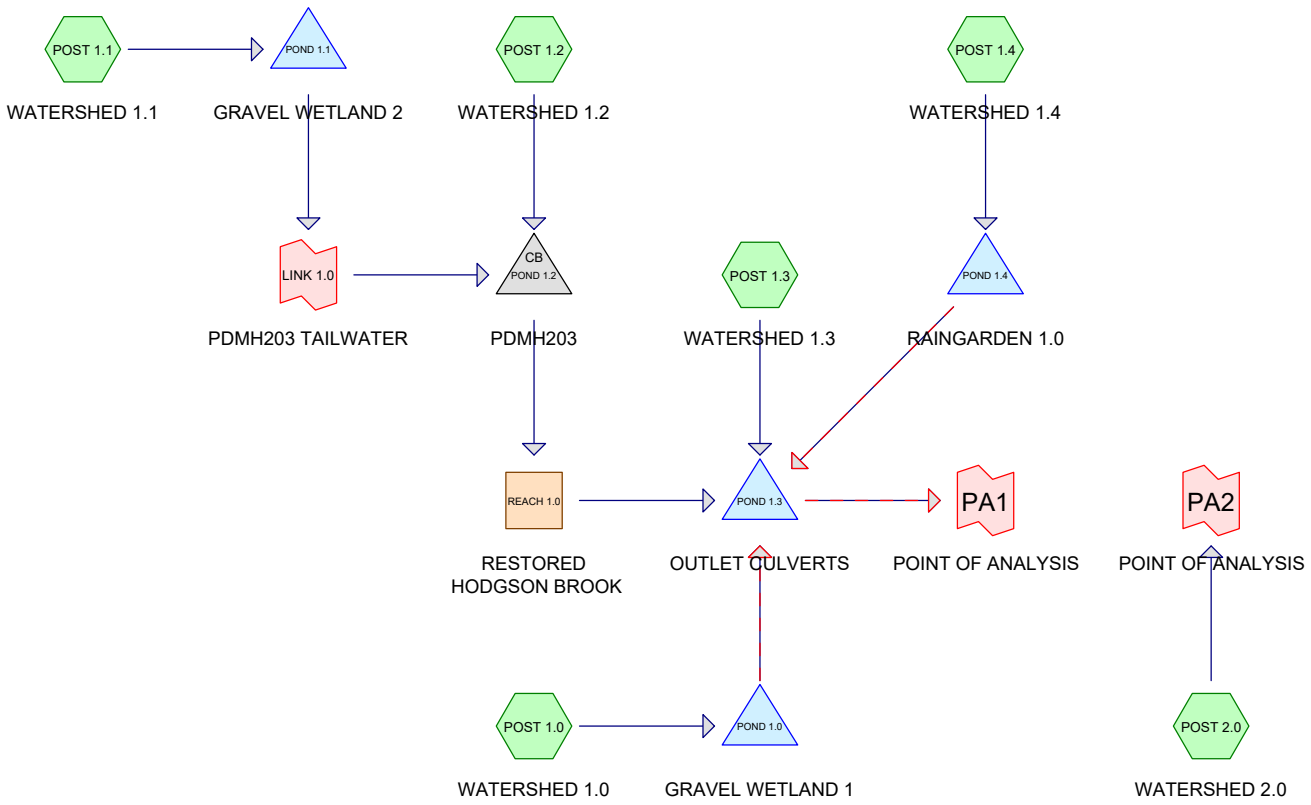
PROJECT NO:	L-0700-013
DATE:	04/03/2018
FILE:	L-0700-026-C-DSGN.dwg
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

POST-DEVELOPMENT WATERSHED AREA PLAN

SCALE: AS SHOWN

C-802

Last Save Date: July 13, 2023 3:42 PM By: CKRZCUIK
Plot Date: Thursday, July 13, 2023 3:42 PM By: CKRZCUIK
T&B File Location: J:\L\0700 Lonza Biologics Expansion was 1576\026_Project Albacore\Drawings\AutoCAD\L-0700-026-C-DSGN.dwg Layout Tab: C-802



Subcat Reach Pond Link

Routing Diagram for L-0700-26 POST
Prepared by Tighe & Bond, Printed 6/6/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.776	61	>75% Grass cover, Good, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4)
6.801	74	>75% Grass cover, Good, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
0.436	80	>75% Grass cover, Good, HSG D (POST 1.0, POST 1.3, POST 1.4)
0.323	58	Meadow, non-grazed, HSG B (POST 1.3)
3.143	71	Meadow, non-grazed, HSG C (POST 1.3)
0.799	98	Paved parking, HSG B (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4)
7.546	98	Paved parking, HSG C (POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0)
0.146	98	Paved parking, HSG D (POST 1.0, POST 1.3, POST 1.4)
0.688	98	Roofs, HSG B (POST 1.0, POST 1.1, POST 1.4)
8.166	98	Roofs, HSG C (POST 1.0, POST 1.1, POST 1.4, POST 2.0)
1.737	98	Roofs, HSG D (POST 1.0, POST 1.4)
0.049	76	Woods/grass comb., Fair, HSG C (POST 1.3)
31.609	**87**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.586	HSG B	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4
25.705	HSG C	POST 1.0, POST 1.1, POST 1.2, POST 1.3, POST 1.4, POST 2.0
2.318	HSG D	POST 1.0, POST 1.3, POST 1.4
0.000	Other	
31.609		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=462,599 sf 72.19% Impervious Runoff Depth>2.71"
Flow Length=933' Tc=11.4 min CN=91 Runoff=27.46 cfs 2.396 af

Subcatchment POST 1.1: WATERSHED Runoff Area=242,496 sf 58.73% Impervious Runoff Depth>2.25"
Flow Length=750' Tc=10.3 min CN=86 Runoff=12.60 cfs 1.046 af

Subcatchment POST 1.2: WATERSHED Runoff Area=101,204 sf 62.15% Impervious Runoff Depth>2.43"
Flow Length=1,191' Tc=6.4 min CN=88 Runoff=6.37 cfs 0.471 af

Subcatchment POST 1.3: WATERSHED Runoff Area=306,549 sf 22.64% Impervious Runoff Depth>1.55"
Flow Length=1,525' Tc=45.9 min CN=77 Runoff=5.81 cfs 0.908 af

Subcatchment POST 1.4: WATERSHED Runoff Area=214,764 sf 85.05% Impervious Runoff Depth>3.01"
Flow Length=717' Tc=7.5 min CN=94 Runoff=15.51 cfs 1.236 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,290 sf 80.99% Impervious Runoff Depth>2.91"
Flow Length=758' Tc=5.0 min CN=93 Runoff=3.72 cfs 0.274 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.60' Max Vel=2.03 fps Inflow=6.37 cfs 0.617 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=4.54 cfs 0.608 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.16' Storage=70,734 cf Inflow=27.46 cfs 2.396 af
Primary=1.57 cfs 1.041 af Secondary=0.00 cfs 0.000 af Outflow=1.57 cfs 1.041 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=53.90' Storage=39,230 cf Inflow=12.60 cfs 1.046 af
Outflow=0.40 cfs 0.146 af

Pond POND 1.2: PDMH203 Peak Elev=50.33' Inflow=6.37 cfs 0.617 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=6.37 cfs 0.617 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.16' Storage=8,984 cf Inflow=9.25 cfs 3.255 af
Primary=9.41 cfs 3.050 af Secondary=0.00 cfs 0.000 af Outflow=9.41 cfs 3.050 af

Pond POND 1.4: RAINGARDEN1.0 Peak Elev=47.27' Storage=34,235 cf Inflow=15.51 cfs 1.236 af
Primary=1.31 cfs 0.699 af Secondary=0.00 cfs 0.000 af Outflow=1.31 cfs 0.699 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=0.40 cfs 0.146 af
Primary=0.40 cfs 0.146 af

Link PA1: POINT OF ANALYSIS Inflow=9.41 cfs 3.050 af
Primary=9.41 cfs 3.050 af

Link PA2: POINT OF ANALYSIS Inflow=3.72 cfs 0.274 af
Primary=3.72 cfs 0.274 af

Total Runoff Area = 31.609 ac Runoff Volume = 6.331 af Average Runoff Depth = 2.40"
39.63% Pervious = 12.527 ac 60.37% Impervious = 19.083 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=462,599 sf 72.19% Impervious Runoff Depth>4.54"
Flow Length=933' Tc=11.4 min CN=91 Runoff=44.88 cfs 4.017 af

Subcatchment POST 1.1: WATERSHED Runoff Area=242,496 sf 58.73% Impervious Runoff Depth>4.01"
Flow Length=750' Tc=10.3 min CN=86 Runoff=22.02 cfs 1.858 af

Subcatchment POST 1.2: WATERSHED Runoff Area=101,204 sf 62.15% Impervious Runoff Depth>4.22"
Flow Length=1,191' Tc=6.4 min CN=88 Runoff=10.81 cfs 0.817 af

Subcatchment POST 1.3: WATERSHED Runoff Area=306,549 sf 22.64% Impervious Runoff Depth>3.09"
Flow Length=1,525' Tc=45.9 min CN=77 Runoff=11.76 cfs 1.810 af

Subcatchment POST 1.4: WATERSHED Runoff Area=214,764 sf 85.05% Impervious Runoff Depth>4.88"
Flow Length=717' Tc=7.5 min CN=94 Runoff=24.45 cfs 2.004 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,290 sf 80.99% Impervious Runoff Depth>4.77"
Flow Length=758' Tc=5.0 min CN=93 Runoff=5.94 cfs 0.449 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.81' Max Vel=2.20 fps Inflow=10.81 cfs 1.367 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=6.07 cfs 1.355 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=46.94' Storage=86,832 cf Inflow=44.88 cfs 4.017 af
Primary=7.09 cfs 2.106 af Secondary=11.63 cfs 0.435 af Outflow=18.72 cfs 2.541 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=55.08' Storage=57,197 cf Inflow=22.02 cfs 1.858 af
Outflow=1.76 cfs 0.550 af

Pond POND 1.2: PDMH203 Peak Elev=50.65' Inflow=10.81 cfs 1.367 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=10.81 cfs 1.367 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=38.86' Storage=14,364 cf Inflow=40.12 cfs 7.107 af
Primary=39.92 cfs 6.819 af Secondary=0.00 cfs 0.000 af Outflow=39.92 cfs 6.819 af

Pond POND 1.4: RAINGARDEN1.0 Peak Elev=48.07' Storage=45,635 cf Inflow=24.45 cfs 2.004 af
Primary=6.60 cfs 1.401 af Secondary=0.00 cfs 0.000 af Outflow=6.60 cfs 1.401 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=1.76 cfs 0.550 af
Primary=1.76 cfs 0.550 af

Link PA1: POINT OF ANALYSIS Inflow=39.92 cfs 6.819 af
Primary=39.92 cfs 6.819 af

Link PA2: POINT OF ANALYSIS Inflow=5.94 cfs 0.449 af
Primary=5.94 cfs 0.449 af

Total Runoff Area = 31.609 ac Runoff Volume = 10.955 af Average Runoff Depth = 4.16"
39.63% Pervious = 12.527 ac 60.37% Impervious = 19.083 ac

Summary for Subcatchment POST 1.0: WATERSHED 1.0

Runoff = 44.88 cfs @ 12.15 hrs, Volume= 4.017 af, Depth> 4.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
5,235	98	Roofs, HSG B
22,410	61	>75% Grass cover, Good, HSG B
19,146	98	Paved parking, HSG B
157,967	98	Roofs, HSG C
90,117	74	>75% Grass cover, Good, HSG C
114,873	98	Paved parking, HSG C
31,357	98	Roofs, HSG D
16,138	80	>75% Grass cover, Good, HSG D
5,356	98	Paved parking, HSG D
462,599	91	Weighted Average
128,665		27.81% Pervious Area
333,934		72.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	70	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.2	32	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	19	0.0200	2.12		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	162	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.4	84	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.5	113	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
1.2	299	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.4	94	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.1	46	0.0240	11.16	35.05	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
0.0	5	0.0800	7.16	0.98	**Pipe Channel,** 5.0" Round Area= 0.1 sf Perim= 1.3' r= 0.10' n= 0.013
0.0	9	0.0110	9.90	69.95	**Pipe Channel,**

36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75'
n= 0.013

11.4	933	Total

Summary for Subcatchment POST 1.1: WATERSHED 1.1

Runoff = 22.02 cfs @ 12.14 hrs, Volume= 1.858 af, Depth> 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
13,692	98	Roofs, HSG B
32,710	61	>75% Grass cover, Good, HSG B
2,729	98	Paved parking, HSG B
88,019	98	Roofs, HSG C
67,375	74	>75% Grass cover, Good, HSG C
37,971	98	Paved parking, HSG C
242,496	86	Weighted Average
100,085		41.27% Pervious Area
142,411		58.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	100	0.0380	0.24		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.2	163	0.0245	2.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.5	283	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.1	81	0.0240	9.21	16.27	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.4	123	0.0050	5.09	16.00	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
10.3	750	Total			

Summary for Subcatchment POST 1.2: WATERSHED 1.2

Runoff = 10.81 cfs @ 12.09 hrs, Volume= 0.817 af, Depth> 4.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
6,874	61	>75% Grass cover, Good, HSG B
4,785	98	Paved parking, HSG B
31,436	74	>75% Grass cover, Good, HSG C
58,109	98	Paved parking, HSG C
101,204	88	Weighted Average
38,310		37.85% Pervious Area
62,894		62.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0100	1.12		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.0	153	0.0150	2.49		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	343	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
0.1	13	0.0050	3.72	4.57	**Pipe Channel,** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.8	453	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
0.4	129	0.0050	5.91	29.00	**Pipe Channel,** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.013 Corrugated PE, smooth interior
6.4	1,191	Total			

Summary for Subcatchment POST 1.3: WATERSHED 1.3

Runoff = 11.76 cfs @ 12.63 hrs, Volume= 1.810 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
11,450	61	>75% Grass cover, Good, HSG B
14,068	58	Meadow, non-grazed, HSG B
908	98	Paved parking, HSG B
70,956	74	>75% Grass cover, Good, HSG C
136,905	71	Meadow, non-grazed, HSG C
2,120	76	Woods/grass comb., Fair, HSG C
68,005	98	Paved parking, HSG C
1,638	80	>75% Grass cover, Good, HSG D
499	98	Paved parking, HSG D
306,549	77	Weighted Average
237,137		77.36% Pervious Area
69,412		22.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0130	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
1.1	52	0.0130	0.80		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	27	0.2720	7.82		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
33.8	1,346	0.0090	0.66		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
45.9	1,525	Total			

Summary for Subcatchment POST 1.4: WATERSHED 1.4

Runoff = 24.45 cfs @ 12.10 hrs, Volume= 2.004 af, Depth> 4.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
11,051	98	Roofs, HSG B
3,902	61	>75% Grass cover, Good, HSG B
7,241	98	Paved parking, HSG B
86,748	98	Roofs, HSG C
26,995	74	>75% Grass cover, Good, HSG C
32,822	98	Paved parking, HSG C
44,300	98	Roofs, HSG D
1,206	80	>75% Grass cover, Good, HSG D
499	98	Paved parking, HSG D
214,764	94	Weighted Average
32,103		14.95% Pervious Area
182,661		85.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	40	0.0150	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.3	53	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	65	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.4	115	0.0100	4.54	3.56	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.7	140	0.0050	3.21	2.52	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
0.9	275	0.0070	4.97	8.79	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013

0.0	29	0.0550	13.94	24.63	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
7.5	717	Total			

Summary for Subcatchment POST 2.0: WATERSHED 2.0

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.94 cfs @ 12.07 hrs, Volume= 0.449 af, Depth> 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=5.58"

Area (sf)	CN	Description
22,995	98	Roofs, HSG C
9,368	74	>75% Grass cover, Good, HSG C
16,927	98	Paved parking, HSG C
49,290	93	Weighted Average
9,368		19.01% Pervious Area
39,922		80.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0164	1.36		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.3	48	0.0164	2.60		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.3	130	0.0140	7.03	12.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
0.5	70	0.0250	2.37		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.3	410	0.0050	5.09	16.00	**Pipe Channel,** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
3.6	758	Total, Increased to minimum Tc = 5.0 min			

Summary for Reach REACH 1.0: RESTORED HODGSON BROOK

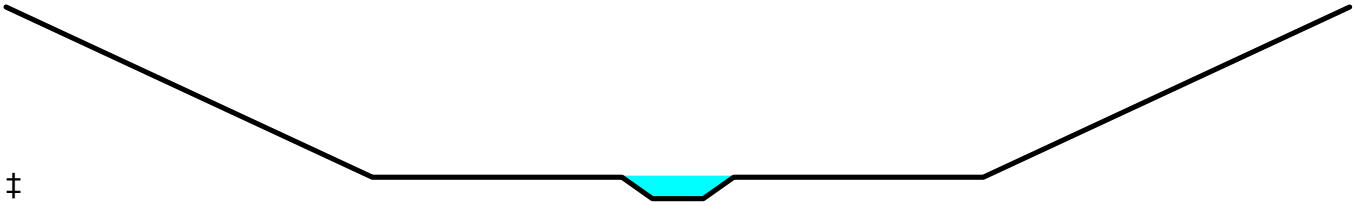
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

Inflow Area = 7.890 ac, 59.73% Impervious, Inflow Depth > 2.08" for 10 Year event
Inflow = 10.81 cfs @ 12.09 hrs, Volume= 1.367 af
Outflow = 6.07 cfs @ 12.81 hrs, Volume= 1.355 af, Atten= 44%, Lag= 42.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.20 fps, Min. Travel Time= 9.9 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 21.0 min

Peak Storage= 6,364 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 6.75' Flow Area= 291.0 sf, Capacity= 2,720.29 cfs

Custom cross-section, Length= 1,309.0' Slope= 0.0092 '/' (101 Elevation Intervals)
Constant n= 0.040 Winding stream, pools & shoals
Inlet Invert= 48.00', Outlet Invert= 36.00'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	12.00	0.00
18.00	6.00	6.00
30.25	6.00	6.00
31.75	5.25	6.75
34.25	5.25	6.75
35.75	6.00	6.00
48.00	6.00	6.00
66.00	12.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	2.5	0	0.00
0.75	3.0	30.4	3,927	2.28
6.75	291.0	68.3	380,919	2,720.29

Summary for Pond POND 1.0: GRAVEL WETLAND 1

[95] Warning: Outlet Device #4 rise exceeded

Inflow Area = 10.620 ac, 72.19% Impervious, Inflow Depth > 4.54" for 10 Year event
Inflow = 44.88 cfs @ 12.15 hrs, Volume= 4.017 af
Outflow = 18.72 cfs @ 12.45 hrs, Volume= 2.541 af, Atten= 58%, Lag= 18.0 min
Primary = 7.09 cfs @ 12.45 hrs, Volume= 2.106 af
Secondary = 11.63 cfs @ 12.45 hrs, Volume= 0.435 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 46.94' @ 12.45 hrs Surf.Area= 21,544 sf Storage= 86,832 cf
Flood Elev= 48.00' Surf.Area= 23,557 sf Storage= 110,845 cf

Plug-Flow detention time= 216.6 min calculated for 2.536 af (63% of inflow)
Center-of-Mass det. time= 118.8 min (906.1 - 787.3)

Volume	Invert	Avail.Storage	Storage Description
#1	39.05'	110,845 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
39.05	9,855	0.0	0	0
41.35	9,855	30.0	6,800	6,800
42.00	9,855	45.0	2,883	9,683
43.00	11,943	100.0	10,899	20,582
44.00	14,202	100.0	13,073	33,654
45.00	16,891	100.0	15,547	49,201
46.00	19,752	100.0	18,322	67,522
47.00	21,668	100.0	20,710	88,232
48.00	23,557	100.0	22,613	110,845

Device	Routing	Invert	Outlet Devices
#1	Primary	41.35'	**18.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 41.35' / 41.20' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	41.35'	**3.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	45.00'	**3.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	46.00'	**3.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 4.0' Crest Height
#5	Device 1	47.00'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600 Limited to weir flow at low heads
#6	Secondary	46.50'	**15.0' long x 15.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=7.09 cfs @ 12.45 hrs HW=46.93' TW=38.85' (Dynamic Tailwater)
- **1=Culvert** (Passes 7.09 cfs of 18.71 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.75 cfs @ 11.23 fps)
  - **3=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.48 fps)
  - **4=Sharp-Crested Rectangular Weir** (Orifice Controls 6.02 cfs @ 4.15 fps)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=11.59 cfs @ 12.45 hrs HW=46.93' TW=38.85' (Dynamic Tailwater)
- **6=Broad-Crested Rectangular Weir** (Weir Controls 11.59 cfs @ 1.78 fps)

Summary for Pond POND 1.1: GRAVEL WETLAND 2

Inflow Area = 5.567 ac, 58.73% Impervious, Inflow Depth > 4.01" for 10 Year event
Inflow = 22.02 cfs @ 12.14 hrs, Volume= 1.858 af
Outflow = 1.76 cfs @ 13.65 hrs, Volume= 0.550 af, Atten= 92%, Lag= 90.5 min
Primary = 1.76 cfs @ 13.65 hrs, Volume= 0.550 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 55.08' @ 13.65 hrs Surf.Area= 16,909 sf Storage= 57,197 cf
Flood Elev= 57.00' Surf.Area= 21,643 sf Storage= 94,743 cf

Plug-Flow detention time= 357.2 min calculated for 0.550 af (30% of inflow)
Center-of-Mass det. time= 218.3 min (1,021.7 - 803.4)

Volume	Invert	Avail.Storage	Storage Description
#1	47.55'	117,304 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.55	6,269	0.0	0	0
49.85	6,269	30.0	4,326	4,326
50.50	6,269	45.0	1,834	6,159
51.00	7,199	100.0	3,367	9,526
52.00	9,187	100.0	8,193	17,719
53.00	11,345	100.0	10,266	27,985
54.00	13,814	100.0	12,580	40,565
55.00	16,645	100.0	15,230	55,794
56.00	19,805	100.0	18,225	74,019
58.00	23,480	100.0	43,285	117,304

Device	Routing	Invert	Outlet Devices
#1	Primary	49.85'	**24.0" Round Culvert** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 49.85' / 49.45' S= 0.0333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	49.85'	**2.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	53.50'	**4.0' long x 2.00' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#4	Device 1	56.50'	**4.0" x 4.0" Horiz. Orifice/Grate X 106.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.76 cfs @ 13.65 hrs HW=55.08' TW=55.07' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.76 cfs @ 0.56 fps)
  ├─**2=Orifice/Grate** (Passes < 0.01 cfs potential flow)
  ├─**3=Sharp-Crested Rectangular Weir** (Passes < 3.33 cfs potential flow)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond POND 1.2: PDMH203

Inflow Area = 7.890 ac, 59.73% Impervious, Inflow Depth > 2.08" for 10 Year event
Inflow = 10.81 cfs @ 12.09 hrs, Volume= 1.367 af
Outflow = 10.81 cfs @ 12.09 hrs, Volume= 1.367 af, Atten= 0%, Lag= 0.0 min
Primary = 10.81 cfs @ 12.09 hrs, Volume= 1.367 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 50.65' @ 12.09 hrs
Flood Elev= 57.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	49.35'	**48.0" Round Culvert** L= 269.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 49.35' / 48.00' S= 0.0050 '/' Cc= 0.900

n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=10.64 cfs @ 12.09 hrs HW=50.64' TW=48.75' (Dynamic Tailwater)
1=Culvert (Inlet Controls 10.64 cfs @ 3.05 fps)

Summary for Pond POND 1.3: OUTLET CULVERTS

[62] Hint: Exceeded Reach REACH 1.0 OUTLET depth by 2.50' @ 23.95 hrs

Inflow Area = 30.478 ac, 59.60% Impervious, Inflow Depth > 2.80" for 10 Year event
Inflow = 40.12 cfs @ 12.47 hrs, Volume= 7.107 af
Outflow = 39.92 cfs @ 12.50 hrs, Volume= 6.819 af, Atten= 0%, Lag= 1.8 min
Primary = 39.92 cfs @ 12.50 hrs, Volume= 6.819 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 38.86' @ 12.50 hrs Surf.Area= 9,266 sf Storage= 14,364 cf
Flood Elev= 43.50' Surf.Area= 95,977 sf Storage= 236,017 cf

Plug-Flow detention time= 32.3 min calculated for 6.819 af (96% of inflow)
Center-of-Mass det. time= 11.6 min (905.1 - 893.5)

Volume	Invert	Avail.Storage	Storage Description
#1	35.00'	236,017 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
35.00	960	0	0
36.00	1,428	1,194	1,194
38.00	5,418	6,846	8,040
40.00	14,354	19,772	27,812
42.00	66,884	81,238	109,050
43.00	92,707	79,796	188,846
43.50	95,977	47,171	236,017

Device	Routing	Invert	Outlet Devices
#1	Primary	35.60'	**42.0" W x 29.0" H, R=21.5"/66.1" Pipe Arch CMP_Arch_1/2 42x29 X 3.00** L= 68.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.60' / 35.30' S= 0.0044 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 6.72 sf
#2	Secondary	43.00'	**143.1 deg x 18.0' long x 0.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=39.88 cfs @ 12.50 hrs HW=38.86' TW=38.65' (Dynamic Tailwater)
1=CMP_Arch_1/2 42x29 (Outlet Controls 39.88 cfs @ 1.98 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=35.00' TW=38.65' (Dynamic Tailwater)
2=Sharp-Crested Vee/Trap Weir (Controls 0.00 cfs)

Summary for Pond POND 1.4: RAINGARDEN 1.0

Inflow Area = 4.930 ac, 85.05% Impervious, Inflow Depth > 4.88" for 10 Year event
Inflow = 24.45 cfs @ 12.10 hrs, Volume= 2.004 af
Outflow = 6.60 cfs @ 12.48 hrs, Volume= 1.401 af, Atten= 73%, Lag= 22.2 min
Primary = 6.60 cfs @ 12.48 hrs, Volume= 1.401 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 48.07' @ 12.48 hrs Surf.Area= 14,774 sf Storage= 45,635 cf
Flood Elev= 50.00' Surf.Area= 17,790 sf Storage= 77,050 cf

Plug-Flow detention time= 233.7 min calculated for 1.398 af (70% of inflow)
Center-of-Mass det. time= 143.1 min (914.3 - 771.2)

Volume	Invert	Avail.Storage	Storage Description
#1	42.17'	77,050 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.17	10,418	0.0	0	0
43.50	10,418	40.0	5,542	5,542
45.00	10,418	10.0	1,563	7,105
46.00	11,745	100.0	11,082	18,187
48.00	14,664	100.0	26,409	44,596
50.00	17,790	100.0	32,454	77,050

Device	Routing	Invert	Outlet Devices
#1	Primary	42.42'	**12.0" Round Culvert** L= 48.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.42' / 42.20' S= 0.0046 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	42.42'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	45.00'	**10.000 in/hr Exfiltration over Surface area above 45.00'** Excluded Surface area = 10,418 sf
#4	Device 1	47.15'	**13.2" x 13.2" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	49.35'	**7.0' long x 8.9' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69

Primary OutFlow Max=6.59 cfs @ 12.48 hrs HW=48.07' TW=38.86' (Dynamic Tailwater)
- **1=Culvert** (Passes 6.59 cfs of 6.77 cfs potential flow)
  - **2=Orifice/Grate** (Passes 1.01 cfs of 2.20 cfs potential flow)
    - **3=Exfiltration** (Exfiltration Controls 1.01 cfs)
  - **4=Orifice/Grate** (Orifice Controls 5.58 cfs @ 4.62 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=42.17' TW=35.00' (Dynamic Tailwater)
- **5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link LINK 1.0: PDMH203 TAILWATER

This link takes into account the tailwater condition in PDMH203 which the outlet of gravel wetland 2 connects. The purpose of this is to determine the effects of any surcharging caused by the tailwater of Hodgson Brook entering the structure. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.1 by 7.52' @ 0.00 hrs (23.95 cfs 25.099 af)

Inflow Area = 5.567 ac, 58.73% Impervious, Inflow Depth > 1.19" for 10 Year event
Inflow = 1.76 cfs @ 13.65 hrs, Volume= 0.550 af
Primary = 1.76 cfs @ 13.65 hrs, Volume= 0.550 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 25 Point manual elevation table, To= 0.00 hrs, dt= 1.00 hrs, feet =

55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07
55.07	55.07	55.07	55.07	55.07	55.07	55.07		

Summary for Link PA1: POINT OF ANALYSIS

This link takes into account the tailwater condition in roadside swale along Goose Bay Drive which the existing culverts discharge into. These tailwater elevations were determined by Streamworks, PLLC as part of the overall watershed analysis they performed.

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[80] Warning: Exceeded Pond POND 1.3 by 3.65' @ 0.00 hrs (92.51 cfs 86.028 af)

Inflow Area = 30.478 ac, 59.60% Impervious, Inflow Depth > 2.69" for 10 Year event
Inflow = 39.92 cfs @ 12.50 hrs, Volume= 6.819 af
Primary = 39.92 cfs @ 12.50 hrs, Volume= 6.819 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

10 Year 2 Point manual elevation table, To= 0.00 hrs, dt= 24.00 hrs, feet =

38.65	38.65

Summary for Link PA2: POINT OF ANALYSIS

Inflow Area = 1.132 ac, 80.99% Impervious, Inflow Depth > 4.77" for 10 Year event
Inflow = 5.94 cfs @ 12.07 hrs, Volume= 0.449 af
Primary = 5.94 cfs @ 12.07 hrs, Volume= 0.449 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=462,599 sf 72.19% Impervious Runoff Depth>6.00"
Flow Length=933' Tc=11.4 min CN=91 Runoff=58.40 cfs 5.309 af

Subcatchment POST 1.1: WATERSHED Runoff Area=242,496 sf 58.73% Impervious Runoff Depth>5.43"
Flow Length=750' Tc=10.3 min CN=86 Runoff=29.42 cfs 2.517 af

Subcatchment POST 1.2: WATERSHED Runoff Area=101,204 sf 62.15% Impervious Runoff Depth>5.66"
Flow Length=1,191' Tc=6.4 min CN=88 Runoff=14.27 cfs 1.095 af

Subcatchment POST 1.3: WATERSHED Runoff Area=306,549 sf 22.64% Impervious Runoff Depth>4.39"
Flow Length=1,525' Tc=45.9 min CN=77 Runoff=16.72 cfs 2.574 af

Subcatchment POST 1.4: WATERSHED Runoff Area=214,764 sf 85.05% Impervious Runoff Depth>6.35"
Flow Length=717' Tc=7.5 min CN=94 Runoff=31.40 cfs 2.610 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,290 sf 80.99% Impervious Runoff Depth>6.24"
Flow Length=758' Tc=5.0 min CN=93 Runoff=7.66 cfs 0.588 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.86' Max Vel=2.20 fps Inflow=14.27 cfs 2.076 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=7.67 cfs 2.061 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.21' Storage=92,932 cf Inflow=58.40 cfs 5.309 af
Primary=19.23 cfs 2.787 af Secondary=24.16 cfs 0.988 af Outflow=43.41 cfs 3.776 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=55.71' Storage=68,356 cf Inflow=29.42 cfs 2.517 af
Outflow=4.20 cfs 0.981 af

Pond POND 1.2: PDMH203 Peak Elev=50.86' Inflow=14.27 cfs 2.076 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=14.27 cfs 2.076 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.33' Storage=19,198 cf Inflow=67.56 cfs 10.378 af
Primary=66.14 cfs 10.071 af Secondary=0.00 cfs 0.000 af Outflow=66.14 cfs 10.071 af

Pond POND 1.4: RAINGARDEN1.0 Peak Elev=48.89' Storage=58,248 cf Inflow=31.40 cfs 2.610 af
Primary=7.29 cfs 1.966 af Secondary=0.00 cfs 0.000 af Outflow=7.29 cfs 1.966 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=4.20 cfs 0.981 af
Primary=4.20 cfs 0.981 af

Link PA1: POINT OF ANALYSIS Inflow=66.14 cfs 10.071 af
Primary=66.14 cfs 10.071 af

Link PA2: POINT OF ANALYSIS Inflow=7.66 cfs 0.588 af
Primary=7.66 cfs 0.588 af

Total Runoff Area = 31.609 ac Runoff Volume = 14.693 af Average Runoff Depth = 5.58"
39.63% Pervious = 12.527 ac 60.37% Impervious = 19.083 ac

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: WATERSHED Runoff Area=462,599 sf 72.19% Impervious Runoff Depth>7.37"
Flow Length=933' Tc=11.4 min CN=91 Runoff=70.91 cfs 6.521 af

Subcatchment POST 1.1: WATERSHED Runoff Area=242,496 sf 58.73% Impervious Runoff Depth>6.77"
Flow Length=750' Tc=10.3 min CN=86 Runoff=36.28 cfs 3.140 af

Subcatchment POST 1.2: WATERSHED Runoff Area=101,204 sf 62.15% Impervious Runoff Depth>7.01"
Flow Length=1,191' Tc=6.4 min CN=88 Runoff=17.48 cfs 1.358 af

Subcatchment POST 1.3: WATERSHED Runoff Area=306,549 sf 22.64% Impervious Runoff Depth>5.65"
Flow Length=1,525' Tc=45.9 min CN=77 Runoff=21.42 cfs 3.313 af

Subcatchment POST 1.4: WATERSHED Runoff Area=214,764 sf 85.05% Impervious Runoff Depth>7.73"
Flow Length=717' Tc=7.5 min CN=94 Runoff=37.84 cfs 3.177 af

Subcatchment POST 2.0: WATERSHED 2.0 Runoff Area=49,290 sf 80.99% Impervious Runoff Depth>7.62"
Flow Length=758' Tc=5.0 min CN=93 Runoff=9.25 cfs 0.718 af

Reach REACH 1.0: RESTORED Avg. Flow Depth=0.90' Max Vel=2.19 fps Inflow=17.48 cfs 2.679 af
n=0.040 L=1,309.0' S=0.0092 '/' Capacity=2,720.29 cfs Outflow=10.33 cfs 2.662 af

Pond POND 1.0: GRAVEL WETLAND 1 Peak Elev=47.48' Storage=98,793 cf Inflow=70.91 cfs 6.521 af
Primary=19.73 cfs 3.345 af Secondary=38.14 cfs 1.616 af Outflow=57.87 cfs 4.961 af

Pond POND 1.1: GRAVEL WETLAND 2 Peak Elev=56.45' Storage=83,107 cf Inflow=36.28 cfs 3.140 af
Outflow=6.58 cfs 1.321 af

Pond POND 1.2: PDMH203 Peak Elev=51.03' Inflow=17.48 cfs 2.679 af
48.0" Round Culvert n=0.013 L=269.0' S=0.0050 '/' Outflow=17.48 cfs 2.679 af

Pond POND 1.3: OUTLET CULVERTS Peak Elev=39.77' Storage=24,643 cf Inflow=87.04 cfs 13.437 af
Primary=83.35 cfs 13.109 af Secondary=0.00 cfs 0.000 af Outflow=83.35 cfs 13.109 af

Pond POND 1.4: RAINGARDEN1.0 Peak Elev=49.56' Storage=69,290 cf Inflow=37.84 cfs 3.177 af
Primary=7.69 cfs 2.462 af Secondary=1.60 cfs 0.039 af Outflow=9.29 cfs 2.500 af

Link LINK 1.0: PDMH203 TAILWATER Inflow=6.58 cfs 1.321 af
Primary=6.58 cfs 1.321 af

Link PA1: POINT OF ANALYSIS Inflow=83.35 cfs 13.109 af
Primary=83.35 cfs 13.109 af

Link PA2: POINT OF ANALYSIS Inflow=9.25 cfs 0.718 af
Primary=9.25 cfs 0.718 af

Total Runoff Area = 31.609 ac Runoff Volume = 18.227 af Average Runoff Depth = 6.92"
39.63% Pervious = 12.527 ac 60.37% Impervious = 19.083 ac

Portsmouth, NH Glare Study Results

Photovoltaic (Solar) Project in Portsmouth, Rockingham County, NH

February 22, 2024

Prepared for:

IPS - Integrated Project Services, LLC
721 Arbor Way, Suite 100
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Prepared by:

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Certified Glare Analyst

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Colliers Engineering & Design

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Appendix

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Conclusion

Collier's Engineering & Design (CED) performed an analysis on the array areas of the proposed rooftop and carport solar project site in Portsmouth, Rockingham County, NH.

Through extensive cross-checking, it was found that at a 5-degree resting angle or above for the rooftop system panels, there is no predicted glare throughout the entire project area. Small amounts of green glare predicted from the carports onto a route directly next to the proposed project are easily mitigated.

The study area is presented in the graphic below. Red Markers represent Observation Points, Turquoise Lines are the roads in and around the proposed project area, and Brown Lines represent the existing foliage in the area and/or the proposed landscaping lines. The Brown Lines around the rooftop systems represent the parapets that run the entire perimeter of the buildings.

A closer view of the immediate project area:

The triangulation of the proposed project in relation to Portsmouth International Airport is provided below. Because of the proximity to the airport and the Air Traffic Control Tower, the client specifically requested a full study to be certain that no glare of any kind would affect the Tower.

To establish a worst-case scenario baseline, a 15-degree angle for the proposed rooftop system facing 214 degrees (azimuth) was programmed on the rooftops of two buildings. For the proposed carports, four array areas were programmed facing 124 degrees (azimuth) and one carport was programmed facing 214 degrees (azimuth). The project was modeled without local foliage lines and other large buildings between the proposed project and the ATCT in the area programmed.

The Air Traffic Control Tower was modeled at a dual height of 130 feet and 120 feet to cover broader possibilities of the proposed project's sightline to anyone in the tower structure.

With the above settings, the modelling predicts ZERO minutes of YELLOW glare over the course of an entire year and ~4,474 minutes of GREEN glare over the course of an entire year. The glare results include ~1,863 minutes of GREEN glare on the Air Traffic Control Tower at Portsmouth International Airport from Carports 1, 3 and 4. **No glare whatsoever is predicted from the rooftop systems onto the ATCT or onto any other point in the study.**

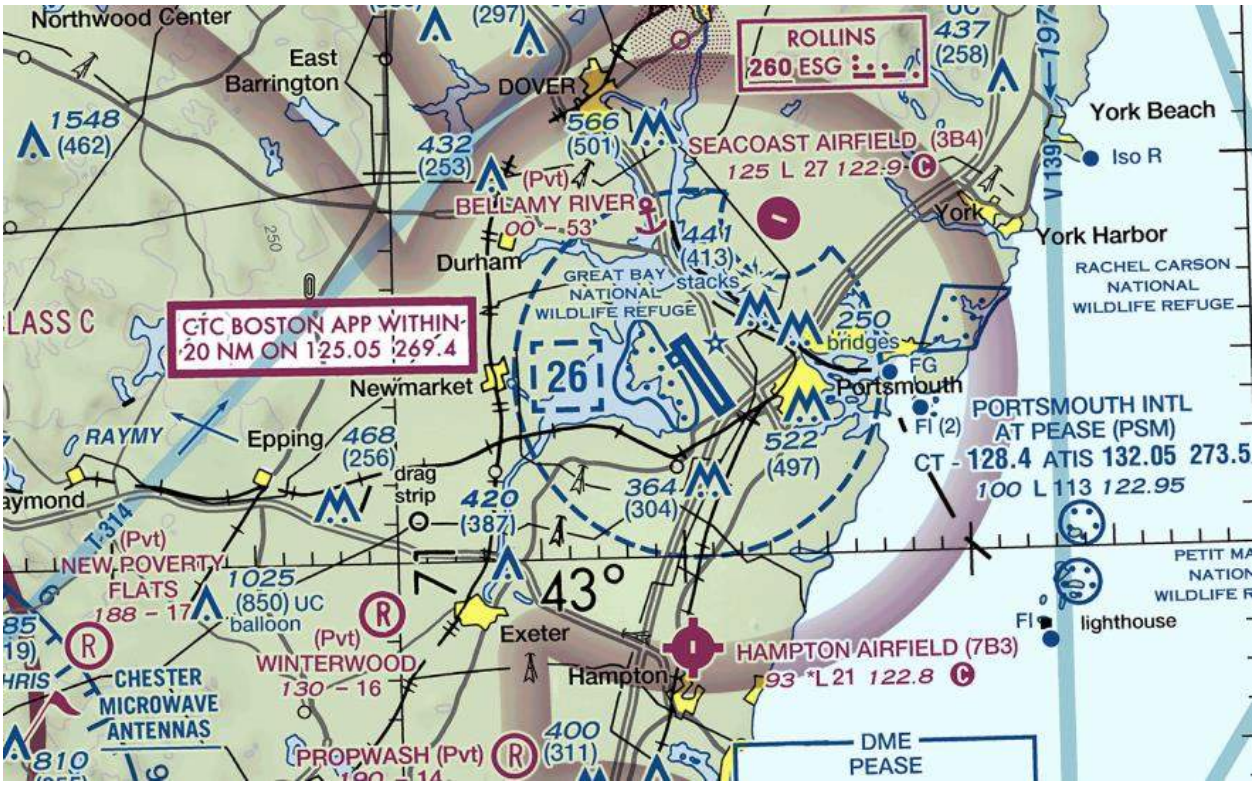
At the proposed working settings of a 5-degree racking tilt on the rooftop systems, and the same settings for the carports components, but WITH all local area foliage, buildings and other obstructions, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

At the proposed working settings of a 10-degree racking tilt on the rooftop systems, and the same settings for the carports components, but WITH all local area foliage, buildings and other obstructions, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

At the proposed working settings of a 13-degree racking tilt on the rooftop systems, and the same settings for the carports components, but WITH all local area foliage, buildings and other obstructions, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

At the proposed working settings of a 15-degree racking tilt on the rooftop systems, and the same settings for the carports components, but WITH all local area foliage, buildings and other obstructions, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

A review of the Federal Aviation Administration's (FAA) New York area Visual Flight Rules (VFR) charts shows no restricted airspace in or around the proposed project area.



A review of Military Training Route (MTR) charts was performed utilizing an additional online resource and the proposed project falls entirely **OUTSIDE** of known training route areas.

The above conclusion is arrived at by utilizing the worst-case scenario results provided by the *ForgeSolar* software, and then manually layering back into each modeling scenario all real-world factors in the area of the proposed site location.

Full technical reporting output by the *ForgeSolar* program is included in the Appendix of this report.

Sincerely,

Colliers Engineering & Design, Inc.
(DBA Maser Consulting)

Elizabeth Claire Myers, PMP
Project Manager, Electrical Engineering
Certified Glare Analyst through Sims Industries

cc: Lee Hill, PE, Colliers Engineering & Design (via email)

R:\Projects\2024\24000681A_IPS_Portsmouth\24000681A_IPS_PortsmouthNH_GlareStudy_DRAFTREPORT.docx

Resources

Federal Aviation Administration – Publicly Available Visual Flight Rules (VFR) Charts
https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/vfr/

- Utilized to obtain FAA-approved VFR charts of the project area for inclusion and consideration in this study.

U.S. Military Training Routes (MTRs) and buffers - May 4, 2018 (Last modified Oct 6, 2021) Uploaded by South Atlantic Blueprint
https://salcc.databasin.org/datasets/4c81852be18444b997f8f860ee568c54/

- Utilized to obtain detail and graphic of US-wide Military Training Routes and location specific data for this study.

Ho, C. K., Ghanbari, C. M., and Diver, R. B., 2011, **Methodology to Assess Potential Glint and Glare Hazards From Concentrating Solar Power Plants: Analytical Models and Experimental Validation**, *ASME J. Sol. Energy Eng., 133*.

Solar Glare Hazard Analysis Tool (SGHAT) Technical Reference Manual

Details of Glare Study

Methodology

(Source Information: https://forgesolar.com/help/#intro)

Collier's Engineering & Design (CED) offers staff specifically trained on glare analyses utilizing *ForgeSolar*, a web-based interactive software that provides a quantified assessment of (1) when and where glare is predicted to occur throughout the year for a prescribed solar installation, and (2) potential effects on the human eye at locations where glare is predicted to occur. *ForgeSolar* is based on the Solar Glare Hazard Analysis Tool ("SGHAT") licensed from Sandia National Laboratories.

These tools meet the FAA standards for glare analysis.

Determination of glare occurrence requires knowledge of the following: sun position, observer location, and the tilt, orientation, location, extent, and optical properties of the modules in the solar array. Vector algebra is then used to determine if glare is likely to be visible from the prescribed observation points.

If glare is predicted, the software calculates the retinal irradiance and subtended angle (size/distance) of the glare source to predict potential ocular hazards ranging from temporary after-image to more severe possible retinal damage. These results are presented in a simple, easy-to-interpret plot that specifies when glare is predicted to occur throughout the year, with color codes indicating the potential ocular hazard.

Background Information

Glint is typically defined as a momentary flash of bright light, often caused by a reflection off a moving source. A typical example of glint is a momentary solar reflection from a moving car, or "catching" something bright out of the corner of your eye.

Glare is defined as a continuous source of bright light. Glare is generally associated with stationary objects, which, due to the slow relative movement of the sun, reflect sunlight for a longer duration.

The difference between glint and glare is duration. Industry-standard glare analysis tools evaluate the occurrence of glare on a minute-by-minute basis; accordingly, they generally refer to solar hazards as 'glare.'

The ocular impact of solar glare is quantified into three categories (Ho, 2011):

1. Green – Unproblematic shine. Low potential to cause after-image. This type of glare can be compared to noticing something shiny in the distance.

2. Yellow - Potential to cause temporary after-image (flash blindness). This type of glare is much like sunrise and sunset glare for drivers who struggle to find the perfect angle for car visors so they can continue to operate their vehicle safely while traveling through areas of such glare.
   a. Standard levels of yellow glare can, for the most part, be handled with relative ease utilizing slatted fencing or local-foliage landscape mitigation measures.
   b. Only extremely high levels of this type of glare (in the area of the chart to the right labeled as "direct viewing of the sun" which is uncommon to find with PV installations) would be considered an insurmountable hurdle to a PV installation of any size.
   c. High levels/intensities and long durations are different factors.

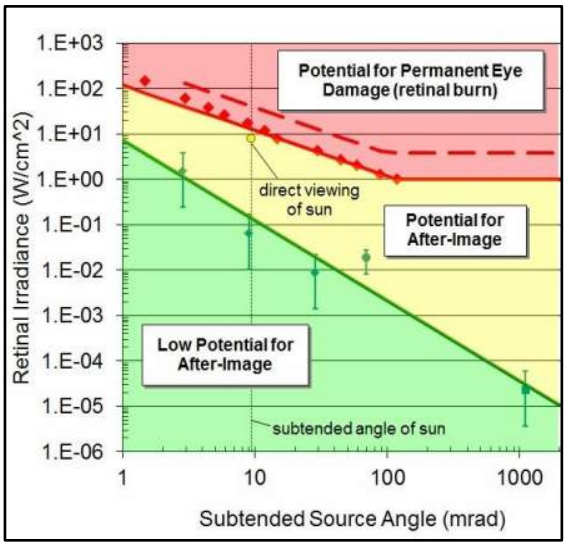


Figure 1 – From *ForgeSolar* website (sample glare hazard plot defining ocular impact as function of retinal irradiance and subtended source angle *(Ho, 2011)*)

3. Red - Potential to cause retinal burn (permanent eye damage). PV modules do not focus reflected sunlight and therefore retinal burn (RED glare) is typically not possible.
   d. This is the ONLY type of glare that would be considered an insurmountable hurdle to a PV installation of any size.

These categories assume a typical blink response in the observer.

Note that retinal burn is typically not possible for PV glare since PV modules do not focus reflected sunlight. They are, in fact, designed to absorb as much sunlight as possible.

To further put glare into perspective, the following is presented.

YELLOW glare such as in the graphic to the right could only be seen when standing directly next to project panels at the perfect angle when the sun is in a perfect place—indeed the point of a photographer standing directly by these panels and waiting for the perfect moment to capture this image. It is also possible that the panels in the picture shown do not have an anti-reflective coating.

Solar panel showing solar glare

GREEN glare, as illustrated directly to the right, is the more common occurrence with solar projects—a noticeable shiny area (in the northwest area) as compared to panels where the sun is not quite in perfect alignment yet.

Even so, the effect of this noticeable shine to certain areas of the project area is still seen from a relatively close up vantage point and at the optimal height this image was captured, possibly by a drone. A similarly sized project in the distance, closer to the horizon of the photo would be unlikely to show even the levels of green glare that the system in the foreground reflects.

Executive Summary

The purpose of the glare study requested by IPS – Integrated Project Service, LLC (IPS) and their client is to closely examine a proposed solar project in Portsmouth, Rockingham County, NH and to provide feedback regarding areas that may warrant closer examination in order to mitigate possible problematic predicted glare to the businesses, residences, and roads surrounding the project area.

Information was provided by IPS and their client in order to complete this study. The project's rooftop PV systems were programmed to a 15-degree tilt axis facing 214 degrees at a height of 88 feet for the smaller structure and 93.83 feet for the larger building. The parapets for these buildings were programmed at heights of 93.21 feet and 99.3 feet respectively.

Four of the projects five carport systems were programmed with two top heights (20.17 feet and 22.48 feet) and a lower edge of 14 feet, facing 124 degrees southeast. A final carport was programmed with a 20.17 foot high edge, a 14 foot lower edge and facing 214 degrees.

It was further assumed that the panels used throughout the proposed project are constructed of Smooth Glass with an Anti-Reflective coating.

Seven (7) Observation Points were placed at different points around the site and programmed to an average height of 5 and a half (5.5) feet to model someone standing in these spots, and to a height of 15 to 20 feet to model a 5.5-foot person standing on the second floor of a home/business with 8-foot ceilings and a 1.5-foot plenum space.

The building directly southwest of the proposed project is industrial in nature, and an examination of the portion that will be facing the project shows that it is industrial in nature with very few windows. One OP was programmed here at a height of 40 feet.

Two Observation Points representing the Air Traffic Control Tower at Portsmouth International Airport were programmed to heights of 130 feet and 120 feet.

Six (6) Route Receptors were programmed for two-way traffic to heights of 4.5 feet and 8.5 feet, effectively representing the eyeline of an average person sitting on/in any vehicle from a bike to a motorcycle, a standard car or SUV, through to the approximated seated height in the cab of an 18-wheeler truck.

While it is impossible to study every possible point and/or angle surrounding a photovoltaic (solar) project, Collier's Engineering & Design (CED) has modeled the project and surrounding areas as best as possible with the most likely points of concern.

PV modules do not focus reflected sunlight and therefore retinal burn is typically not possible. They are, in fact, designed to absorb as much sunlight as possible. Modern photovoltaic panels actually cause less glare than standard home window glass; and research has shown that they reflect less light than snow, white concrete and energy-efficient white rooftops.

The YELLOW glare we are looking to identified with this study is much like sunrise and sunset glare for drivers who struggle to find the perfect angle for car visors so they can continue to operate their vehicle safely while traveling through areas of such glare. In general, photovoltaic panel systems of any size produce some glare predominately during early sunrise and sunset throughout the Spring

through Fall months—although glare is possible throughout each day as well as throughout the entire year.

ForgeSolar now allows the programming of obstructions. It was utilized in this study to model in existing treelines, local warehouses and other buildings and the parapets of the proposed new buildsings for this project with estimated heights. Local foliage lines were modeled at a conservative height of 17 to 30 feet in height. Local warehouses were modeled conservatively at 20 to 30 feet high.

After examining each point and then factoring in additionally recommended foliage, distance, and elevation changes, points where predicted glare is blocked by natural obstructions were removed from the listing of points to be examined more closely. Finally, if any glare continues to be predicted in any area, this analyst will address the areas that present the most possibility for likely glare.

ASSUMPTIONS

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.*
- Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.

Results of this Study

WORST CASE SCENARIO without Local Foliage - RESULTS at 15 Degree Resting Angle

To establish a worst-case scenario baseline, the project was modeled without any local foliage lines or building obstructions between the proposed project and the Air Traffic Control Tower at the Portsmouth International Airport. The modelling predicts ZERO minutes of YELLOW glare over the course of an entire year and ~4,474 minutes of GREEN glare over the course of an entire year. The glare results include ~1,855 minutes of GREEN glare on the Air Traffic Control Tower at Portsmouth International Airport from Carports 1, 3 and 4. No glare whatsoever is predicted from the rooftop systems onto the ATCT or onto any other point in the study.

RESULTS at 5 Degree Angle

At the proposed working settings of a 5-degree racking tilt on the rooftop systems, and the same settings for the carports components, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

RESULTS at 10 Degree Resting Angle

At the proposed working settings of a 10-degree racking tilt on the rooftop systems, and the same settings for the carports components, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

RESULTS at 13 Degree Resting Angle

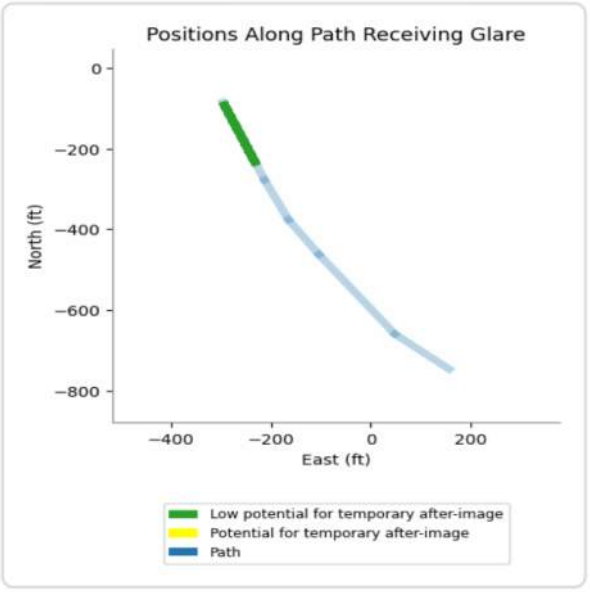
At the proposed working settings of a 13-degree racking tilt on the rooftop systems, and the same settings for the carports components, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

RESULTS at 15 Degree Resting Angle

At the proposed working settings of a 15-degree racking tilt on the rooftop systems, and the same settings for the carports components, the modelling predicts zero minutes of YELLOW glare over the course of an entire year and ~802 minutes of GREEN glare over the course of an entire year. This glare is exclusively from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.

AREAS OF GLARE

In ALL results, the areas of glare from Carport 3 and Carport 4 onto Routes 3 (4.5 feet) and 4 (8.5 feet) which run directly in front of the proposed project area.



A final run scenario with a small planting of trees at the area marked in green in the "Positions Along Path Receiving Glare" shows that a screen of 9 feet at initial planting will completely mitigate any glare shown.

Summary of Results No glare predicted!

PV Name	Tilt	Orientation	"Green" Glare
	deg	deg	min
CRPRT1	0.0	124.0	0
CRPRT2	0.0	124.0	0
CRPRT3	0.0	124.0	0
CRPRT4	0.0	124.0	0
CRPRT5	0.0	214.0	0
LGBLDG	10.0	214.0	0
SMBLDG	10.0	214.0	0

Summary of FAA-Level Flight Path Screening Results

Portsmouth International Airport sits under 1mile away from the project on the western side. All obstructions were kept in place for the FAA screening and the project was modeled at the 10 degree rooftop PV system tilt.

FEDERAL AVIATION ADMINISTRATION (FAA) SCREENS

An FAA-level glare analysis was performed and a report specific to this request can be found in Appendix A of this report. The Air Traffic Control Tower at Portsmouth International Airport is modeled for this study at its height of 130 feet. Additionally, a second point was modeled at 120 feet to be certain of the glare study results.

Per the FAA's most recent 2021 policy regarding solar around airports, this project PASSES.

Project: **ALBACORE, Portsmouth, NH**
Site configuration: **Albacore_10DegreeTilt_124Carports_ATCT_FAAReport**

Created 22 Feb, 2024
Updated 22 Feb, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Site ID 112738.19298

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Glare Policy Adherence

The following table estimates the policy adherence of this glare analysis according to the **2021** U.S. Federal Aviation Administration Policy:

Review of Solar Energy System Projects on Federally-Obligated Airports

This policy may require the following criteria be met for solar energy systems on airport property:

- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics, including 1-minute time step.

ForgeSolar is not affiliated with the U.S. FAA and does not represent or speak officially for the U.S. FAA. ForgeSolar cannot approve or deny projects - results are informational only. Contact the relevant airport and FAA district office for information on policy and requirements.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
ATCT(s)	PASS	Receptor(s) marked as ATCT do not receive glare

The complete updated FAA Policy can be read at: https://www.federalregister.gov/d/2021-09862

NOTE: ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

On May 26, 2021, the Federal Aviation Administration updated their policies regarding the installation of solar on and/or near regulated airports/airstrips.

While this policy of the Federal Aviation Administeration does not apply to solar energy systems on airports that do not have an Air Traffic Control Tower (ATCT), airports that are not federally-obligated, or solar energy systems not located on airport property—it does provide a high benchmark to meet to ensure that proposed solar installations do not create glare that poses any sort of safety hazard for pilots.

The brief of this FAA policy update states:

"The Federal Aviation Administration (FAA) published a final policy aimed at ensuring that airport solar projects don't create hazardous glare. The policy requires airports to measure the visual impact of such projects on pilots and air traffic control personnel.

The policy applies to proposed solar energy systems at federally obligated airports with control towers. Federally obligated airports are public airports that have accepted federal assistance either in the form of grants of property conveyances

As more airports invests in this technology for environmental and economic benefits, the FAA wants to make sure that the reflection from the systems' glass surfaces do not create a glare that poses a safety hazard for pilots and air traffic controllers.

Under the final policy, airports are no longer required to submit the results of an ocular analysis to FAA. Instead, the airport must file a Notice of Proposed Construction or Alteration Form 7460-1 that includes a statement that the project will not cause any visual impact. The airport submits the form to the FAA for review and approval.

The FAA relies on the airport to confirm via the form that it has sufficiently analyzed the potential for glint and glare and determined there is no potential for ocular impact to the airport traffic control tower cab. If any impacts are discovered after construction, the airport must mitigate the impact at its expense. The airport may also face compliance action for failure to address visual impacts that create aviation safety hazards. As such, the agency encourages an airport to conduct sufficient analysis before installing a solar energy system.

The FAA is also withdrawing the recommended tool for measuring the ocular impact of potential glint and glare effects on pilots and air traffic controllers."

Additionally:
"Initially, FAA believed that solar energy systems could introduce a novel glint and glare effect to pilots on final approach. FAA has subsequently concluded that in most cases, the glint and glare from solar energy systems to pilots on final approach is similar to glint and glare pilots routinely experience from water bodies, glass-façade buildings, parking lots, and similar features. However, FAA has continued to receive reports of potential glint and glare from on-airport solar energy systems on personnel working in ATCT cabs. Therefore, FAA has determined the scope of agency policy should be focused on the impact of on-airport solar energy systems to federally-obligated towered airports, specifically the airport's ATCT cab."

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Appendix

Appendix A | Detailed Glare Study Result Reports

The following pages are the full reporting results delivered directly from *ForgeSolar*.

FORGESOLAR GLARE ANALYSIS

Project: **ALBACORE, Portsmouth, NH**
Site configuration: **Albacore_10DegreeTilt_124Carports_ATCT_FAAReport**

Client: Lonza

Created 22 Feb, 2024
Updated 22 Feb, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Site ID 112738.19298

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Glare Policy Adherence

The following table estimates the policy adherence of this glare analysis according to the **2021** U.S. Federal Aviation Administration Policy:

Review of Solar Energy System Projects on Federally-Obligated Airports

This policy may require the following criteria be met for solar energy systems on airport property:

- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics, including 1-minute time step.

ForgeSolar is not affiliated with the U.S. FAA and does not represent or speak officially for the U.S. FAA. ForgeSolar cannot approve or deny projects - results are informational only. Contact the relevant airport and FAA district office for information on policy and requirements.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
ATCT(s)	PASS	Receptor(s) marked as ATCT do not receive glare

The referenced policy can be read at https://www.federalregister.gov/d/2021-09862

Component Data

This report includes results for PV arrays and Observation Point ("OP") receptors marked as ATCTs. Components that are not pertinent to the policy, such as routes, flight paths, and vertical surfaces, are excluded.

PV Arrays

Name: CRPRT1
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 124.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 124.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 124.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 124.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Axis tracking: Fixed (no rotation)
Tilt: 0.0°
Orientation: 214.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Axis tracking: Fixed (no rotation)
Tilt: 10.0°
Orientation: 214.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Axis tracking: Fixed (no rotation)
Tilt: 10.0°
Orientation: 214.0°
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Observation Point ATCT Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
1-ATCT	1	43.084384	-70.818882	89.93	130.00
6-ATCT	6	43.084349	-70.818856	89.97	120.00

Map image of 1-ATCT

Map image of 6-ATCT

Obstruction Components

Name: BLDG1
Top height: 12.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084600	-70.810084	76.71
2	43.084703	-70.809846	77.63
3	43.084534	-70.809702	77.38
4	43.084428	-70.809944	77.34
5	43.084600	-70.810084	76.71

Name: BLDG2
Top height: 20.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Top height: 22.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Top height: 22.5 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Top height: 22.5 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Top height: 20.2 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Top height: 93.2 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Top height: 99.3 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Top height: 35.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Top height: 30.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees
Top height: 17.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees1
Top height: 40.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Top height: 60.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Top height: 100.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Top height: 30.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Top height: 45.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Top height: 20.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Top height: 30.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Top height: 30.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Top height: 30.0 ft

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Glare Analysis Results

Summary of Results No glare predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
CRPRT1	0.0	124.0	0	0.0	0	0.0	-
CRPRT2	0.0	124.0	0	0.0	0	0.0	-
CRPRT3	0.0	124.0	0	0.0	0	0.0	-
CRPRT4	0.0	124.0	0	0.0	0	0.0	-
CRPRT5	0.0	214.0	0	0.0	0	0.0	-
LGBLDG	10.0	214.0	0	0.0	0	0.0	-
SMBLDG	10.0	214.0	0	0.0	0	0.0	-

Total annual glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

PV: CRPRT1

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

CRPRT1 and 1-ATCT

Receptor type: ATCT Observation Point
No glare found

CRPRT1 and 6-ATCT

Receptor type: ATCT Observation Point
No glare found

PV: CRPRT2

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

CRPRT2 and 1-ATCT

Receptor type: ATCT Observation Point
No glare found

CRPRT2 and 6-ATCT

Receptor type: ATCT Observation Point
No glare found

PV: CRPRT3

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

CRPRT3 and 1-ATCT

Receptor type: ATCT Observation Point
No glare found

CRPRT3 and 6-ATCT

Receptor type: ATCT Observation Point
No glare found

PV: CRPRT4

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

CRPRT4 and 1-ATCT

Receptor type: ATCT Observation Point
No glare found

CRPRT4 and 6-ATCT

Receptor type: ATCT Observation Point
No glare found

PV: CRPRT5

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

CRPRT5 and 1-ATCT

Receptor type: ATCT Observation Point
No glare found

CRPRT5 and 6-ATCT

Receptor type: ATCT Observation Point
No glare found

PV: LGBLDG

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

LGBLDG and 1-ATCT

Receptor type: ATCT Observation Point
No glare found

LGBLDG and 6-ATCT

Receptor type: ATCT Observation Point
No glare found

PV: SMBLDG

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
1-ATCT	0	0.0	0	0.0
6-ATCT	0	0.0	0	0.0

SMBLDG and 1-ATCT

Receptor type: ATCT Observation Point
No glare found

SMBLDG and 6-ATCT

Receptor type: ATCT Observation Point
No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

Default glare analysis parameters and observer eye characteristics (for reference only):

- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

ALBACORE, Portsmouth, NH

Albacore_10DegreeTilt_124Carports_ATCT_FAAReport

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112738.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results No glare predicted!

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	0	0	-
CRPRT4	0.0	124.0	0	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	10.0	214.0	0	0	-
SMBLDG	10.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG1
Upper edge height: 12.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084600	-70.810084	76.71
2	43.084703	-70.809846	77.63
3	43.084534	-70.809702	77.38
4	43.084428	-70.809944	77.34
5	43.084600	-70.810084	76.71

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	0	0	-	-
CRPRT4	0.0	124.0	0	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	10.0	214.0	0	0	-	-
SMBLDG	10.0	214.0	0	0	-	-

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

CRPRT3 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

CRPRT4 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_15Tilt_124Carports_NOObstrctns_2ATCT_AddOP

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112714.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results

Glare with low potential for temporary after-image predicted

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	1,543	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	1,314	0	-
CRPRT4	0.0	124.0	1,617	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	15.0	214.0	0	0	-
SMBLDG	15.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 15.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 15.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083312	-70.803940	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
CRPRT1	0.0	124.0	1,543	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	1,314	0	-	-
CRPRT4	0.0	124.0	1,617	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	15.0	214.0	0	0	-	-
SMBLDG	15.0	214.0	0	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
crprt1 (green)	0	0	105	292	0	0	0	81	319	0	0	0
crprt1 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt3 (green)	0	88	142	137	0	0	0	1	281	86	0	0
crprt3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt4 (green)	0	139	219	103	0	0	0	0	273	187	0	0
crprt4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

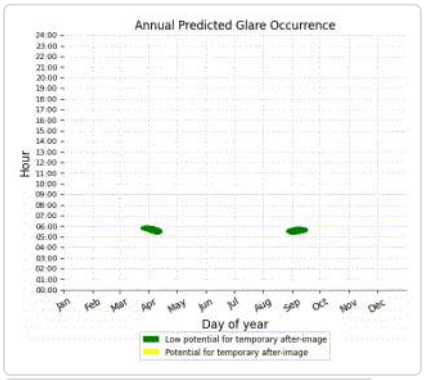
CRPRT1 low potential for temporary after-image

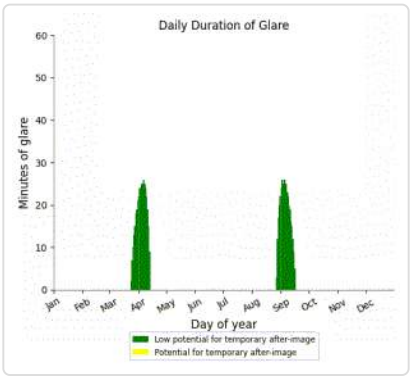
Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	783	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	760	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

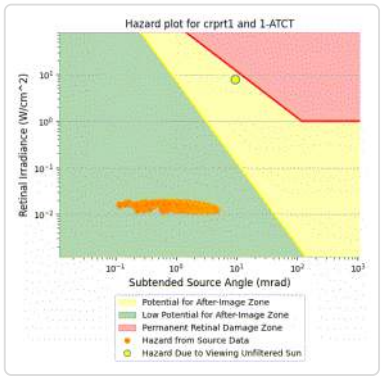
CRPRT1: 1-ATCT

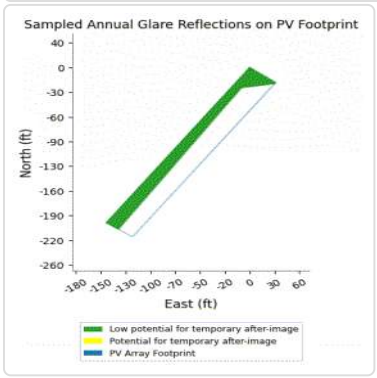
PV array is expected to produce the following glare for this receptor:

- 783 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT1: OP 2

No glare found

CRPRT1: OP 3

No glare found

CRPRT1: OP 4

No glare found

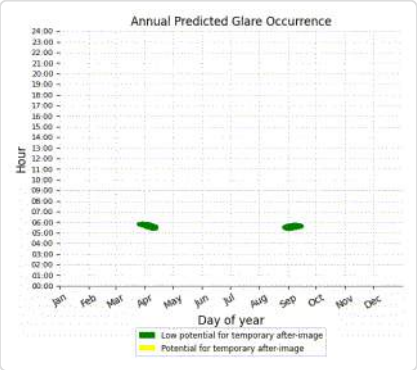
CRPRT1: OP 5

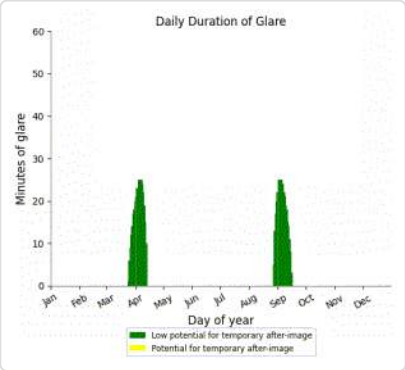
No glare found

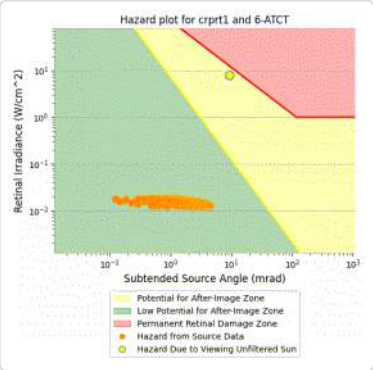
CRPRT1: 6-ATCT

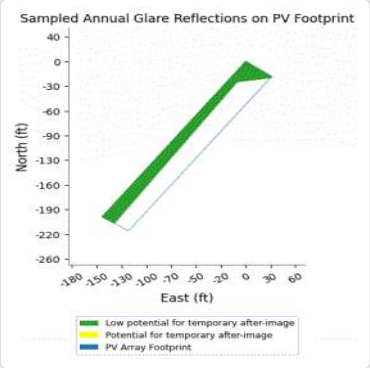
PV array is expected to produce the following glare for this receptor:

- 760 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT1: OP 7

No glare found

CRPRT1: Route 1

No glare found

CRPRT1: Route 2

No glare found

CRPRT1: Route 3

No glare found

CRPRT1: Route 4

No glare found

CRPRT1: Route 5

No glare found

CRPRT1: Route 6

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

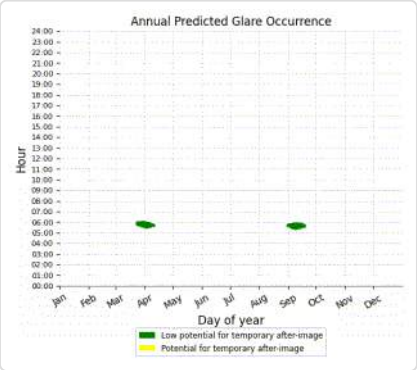
CRPRT3 low potential for temporary after-image

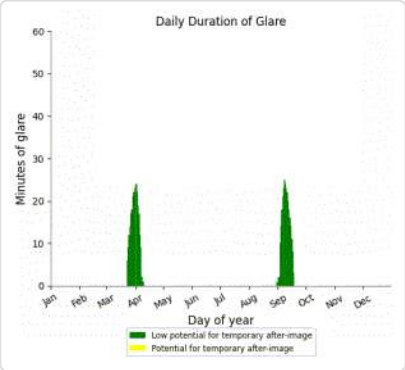
Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	548	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	530	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	78	0
Route: Route 4	158	0
Route: Route 5	0	0
Route: Route 6	0	0

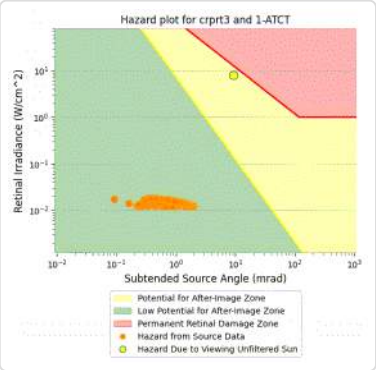
CRPRT3: 1-ATCT

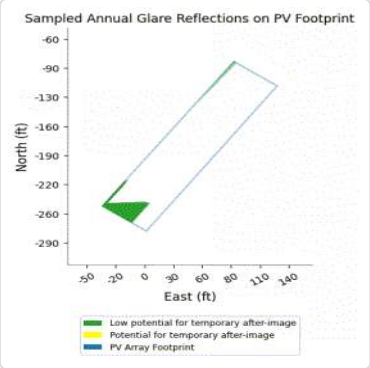
PV array is expected to produce the following glare for this receptor:

- 548 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT3: OP 2

No glare found

CRPRT3: OP 3

No glare found

CRPRT3: OP 4

No glare found

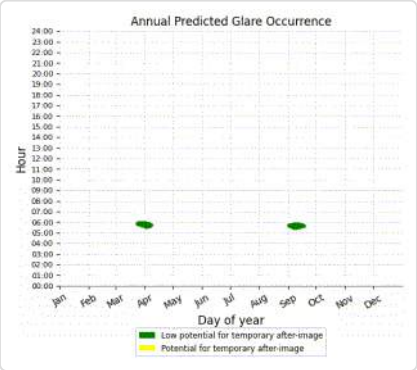
CRPRT3: OP 5

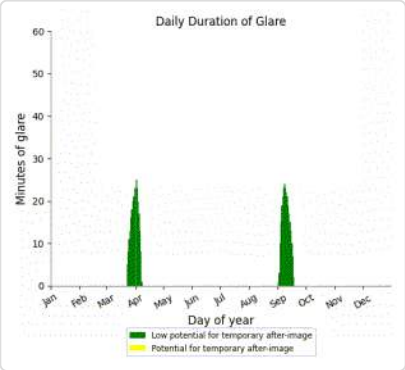
No glare found

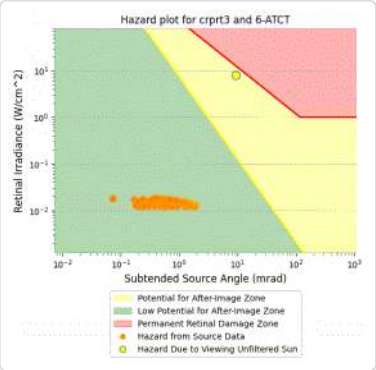
CRPRT3: 6-ATCT

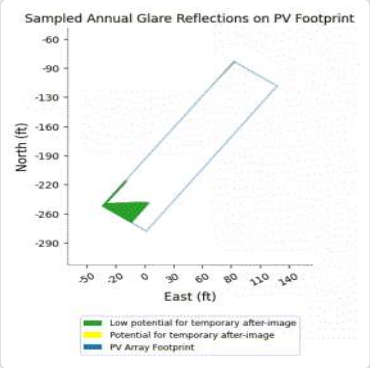
PV array is expected to produce the following glare for this receptor:

- 530 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT3: OP 7

No glare found

CRPRT3: Route 1

No glare found

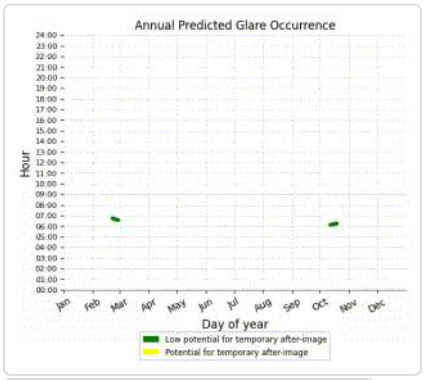
CRPRT3: Route 2

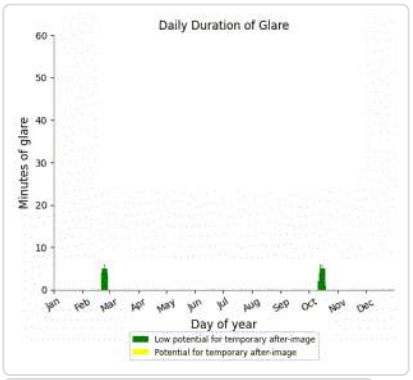
No glare found

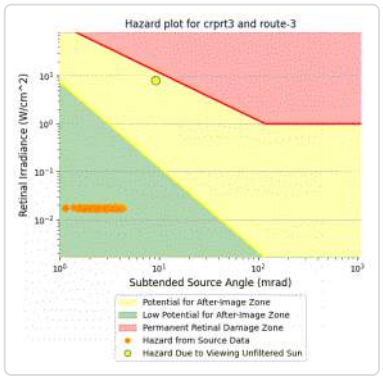
CRPRT3: Route 3

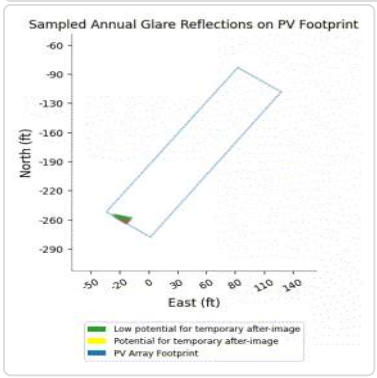
PV array is expected to produce the following glare for this receptor:

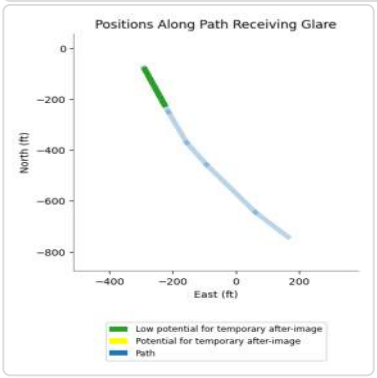
- 78 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







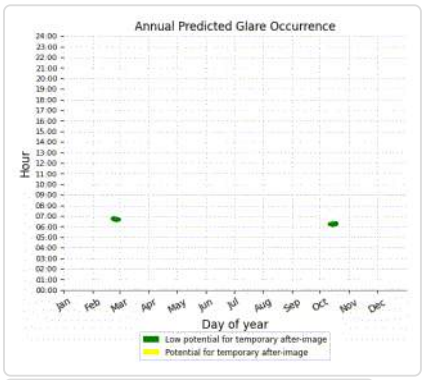


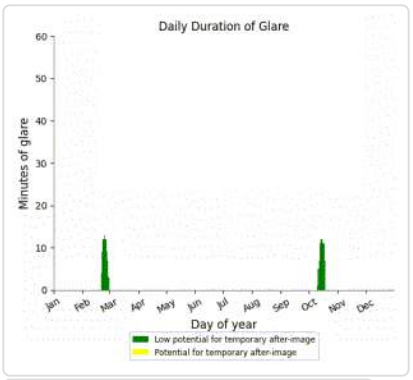


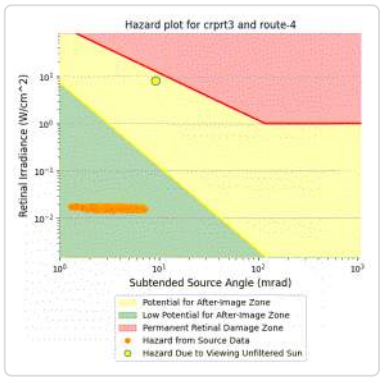
CRPRT3: Route 4

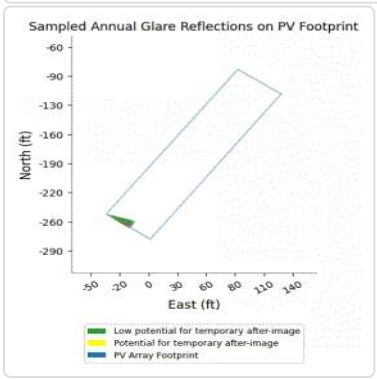
PV array is expected to produce the following glare for this receptor:

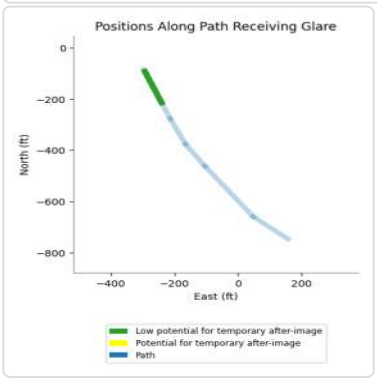
- 158 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT3: Route 5

No glare found

CRPRT3: Route 6

No glare found

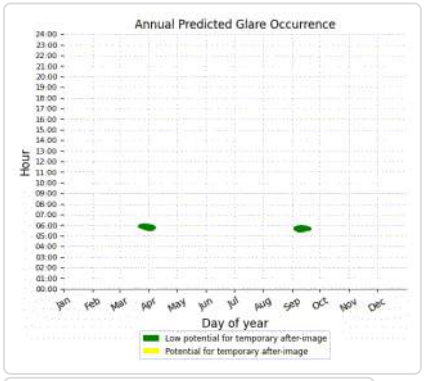
CRPRT4 low potential for temporary after-image

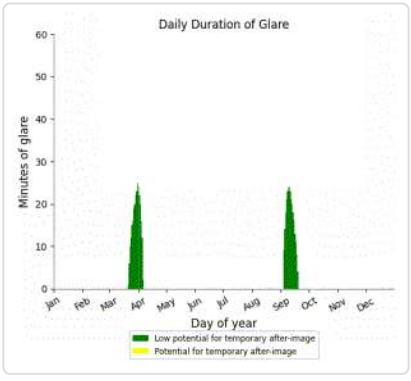
Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	532	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	514	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	314	0
Route: Route 4	257	0
Route: Route 5	0	0
Route: Route 6	0	0

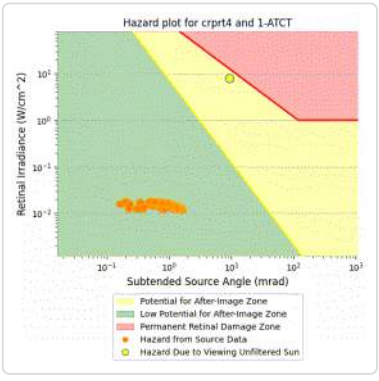
CRPRT4: 1-ATCT

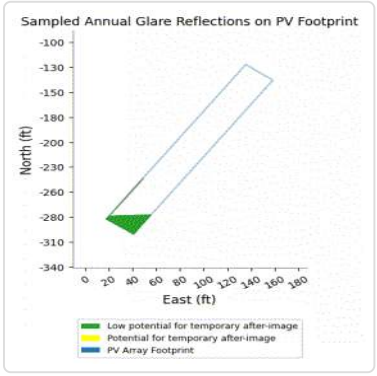
PV array is expected to produce the following glare for this receptor:

- 532 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT4: OP 2

No glare found

CRPRT4: OP 3

No glare found

CRPRT4: OP 4

No glare found

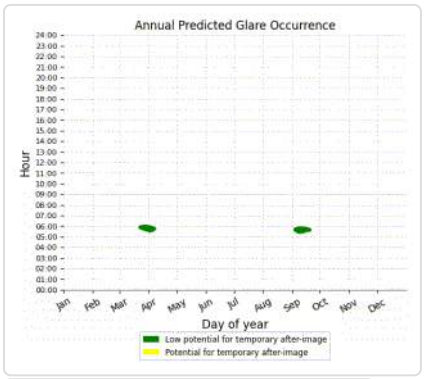
CRPRT4: OP 5

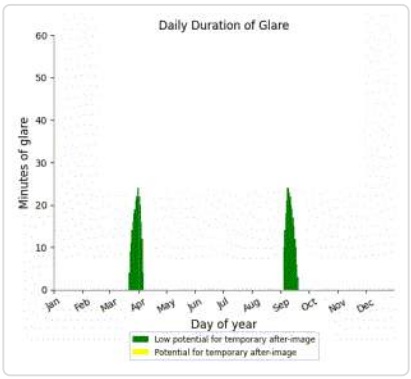
No glare found

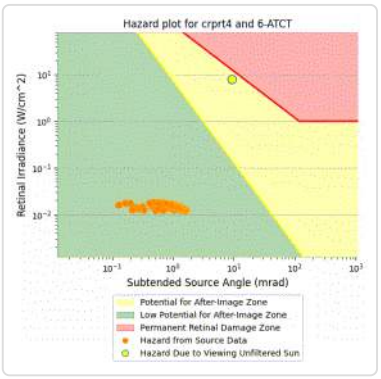
CRPRT4: 6-ATCT

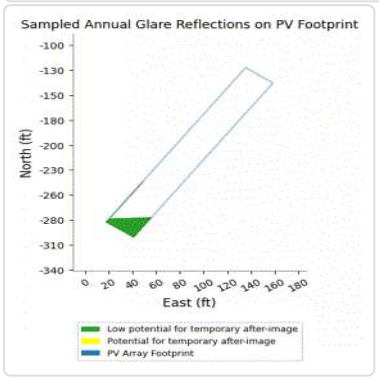
PV array is expected to produce the following glare for this receptor:

- 514 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.









CRPRT4: OP 7

No glare found

CRPRT4: Route 1

No glare found

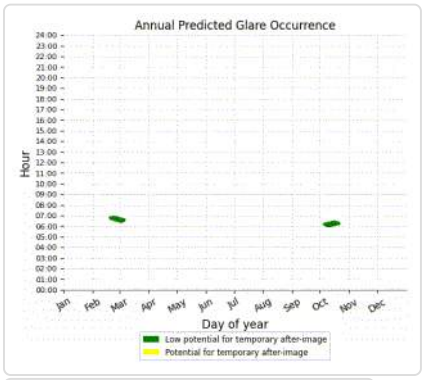
CRPRT4: Route 2

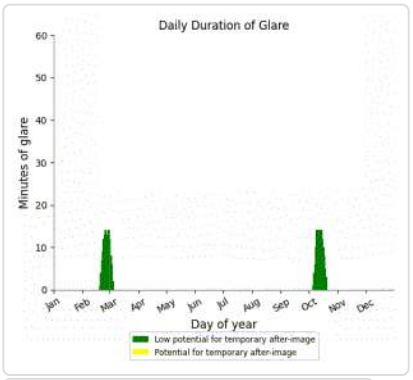
No glare found

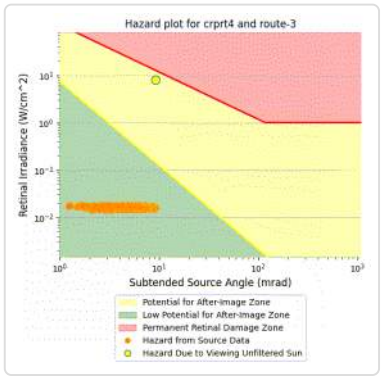
CRPRT4: Route 3

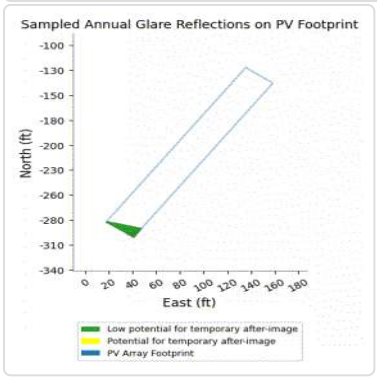
PV array is expected to produce the following glare for this receptor:

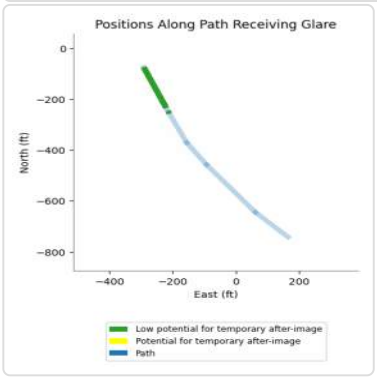
- 314 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







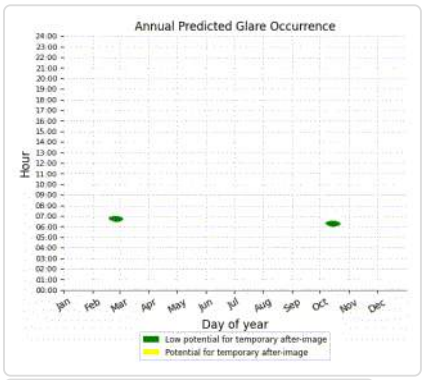


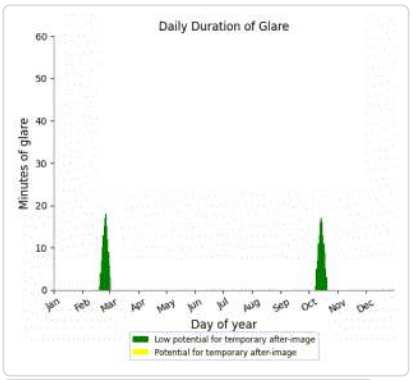


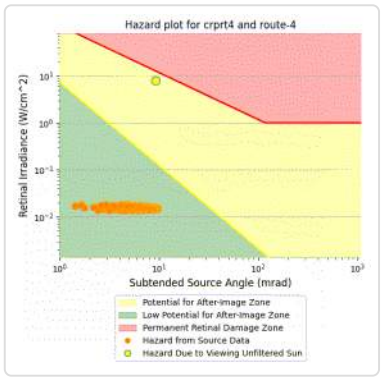
CRPRT4: Route 4

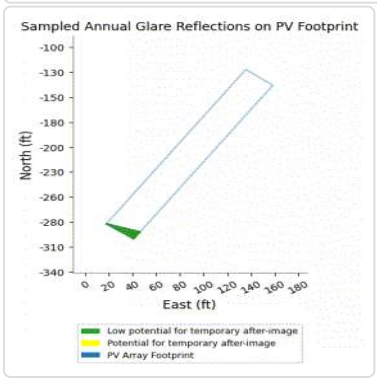
PV array is expected to produce the following glare for this receptor:

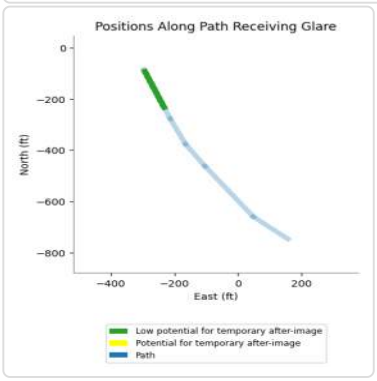
- 257 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT4: Route 5

No glare found

CRPRT4: Route 6

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_10Tilt_124Carports_Obstrctns_2ATCT_AddOP

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112715.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results No glare predicted!

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	0	0	-
CRPRT4	0.0	124.0	0	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	10.0	214.0	0	0	-
SMBLDG	10.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083343	-70.803962	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PLANTING
Upper edge height: 9.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085446	-70.804721	64.24
2	43.084717	-70.804268	69.47
3	43.084592	-70.804158	69.46

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	0	0	-	-
CRPRT4	0.0	124.0	0	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	10.0	214.0	0	0	-	-
SMBLDG	10.0	214.0	0	0	-	-

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT3 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT4 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.

- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_5Tilt_124Carports_Obstrctns_2ATCT_NoPlant

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112718.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results

Glare with low potential for temporary after-image predicted

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	236	0	-
CRPRT4	0.0	124.0	566	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	5.0	214.0	0	0	-
SMBLDG	5.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 5.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 5.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083343	-70.803962	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	236	0	-	-
CRPRT4	0.0	124.0	566	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	5.0	214.0	0	0	-	-
SMBLDG	5.0	214.0	0	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
crprt3 (green)	0	87	0	0	0	0	0	0	0	85	0	0
crprt3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt4 (green)	0	139	48	0	0	0	0	0	0	186	0	0
crprt4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT3 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	79	0
Route: Route 4	157	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT3: 1-ATCT

No glare found

CRPRT3: OP 2

No glare found

CRPRT3: OP 3

No glare found

CRPRT3: OP 4

No glare found

CRPRT3: OP 5

No glare found

CRPRT3: 6-ATCT

No glare found

CRPRT3: OP 7

No glare found

CRPRT3: Route 1

No glare found

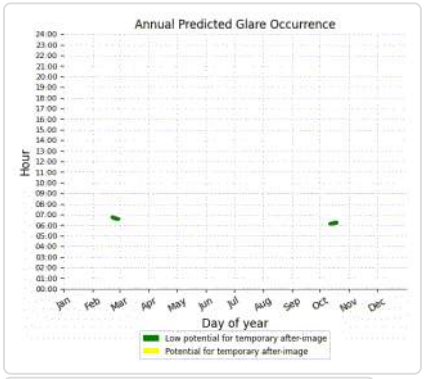
CRPRT3: Route 2

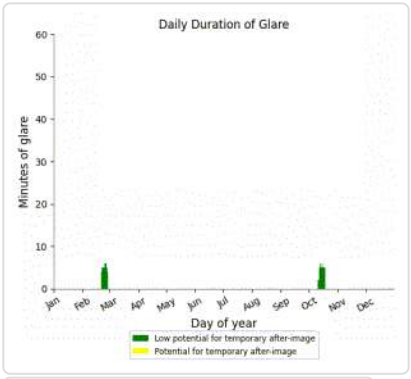
No glare found

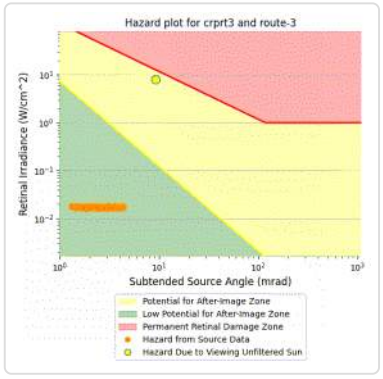
CRPRT3: Route 3

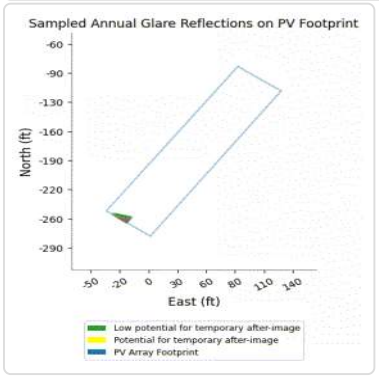
PV array is expected to produce the following glare for this receptor:

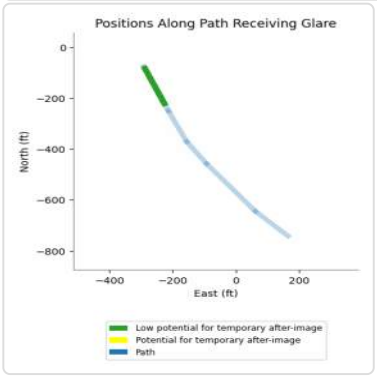
- 79 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







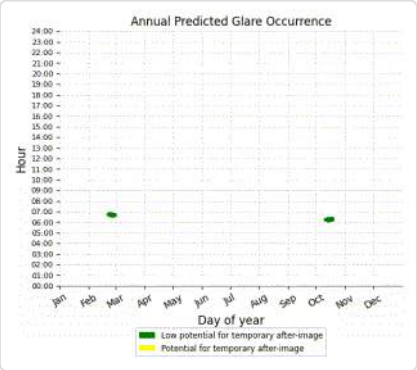


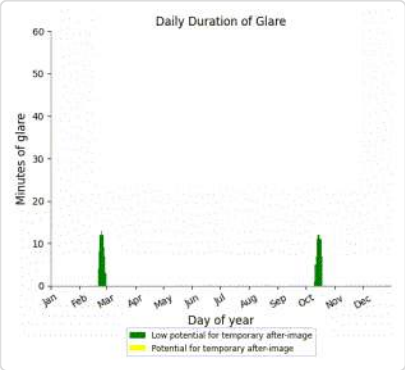


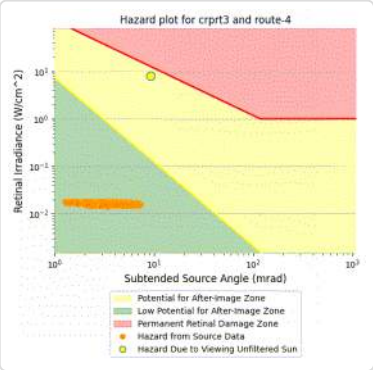
CRPRT3: Route 4

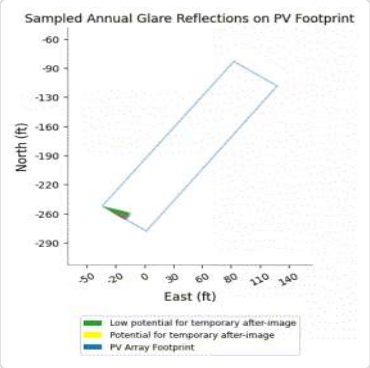
PV array is expected to produce the following glare for this receptor:

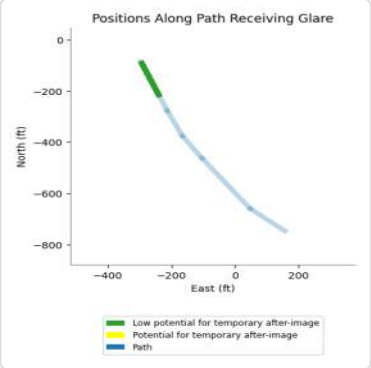
- 157 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT3: Route 5

No glare found

CRPRT3: Route 6

No glare found

CRPRT4 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	311	0
Route: Route 4	255	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT4: 1-ATCT

No glare found

CRPRT4: OP 2

No glare found

CRPRT4: OP 3

No glare found

CRPRT4: OP 4

No glare found

CRPRT4: OP 5

No glare found

CRPRT4: 6-ATCT

No glare found

CRPRT4: OP 7

No glare found

CRPRT4: Route 1

No glare found

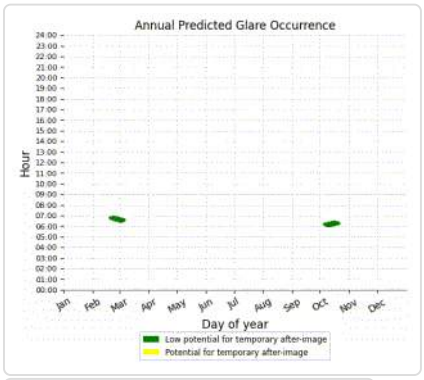
CRPRT4: Route 2

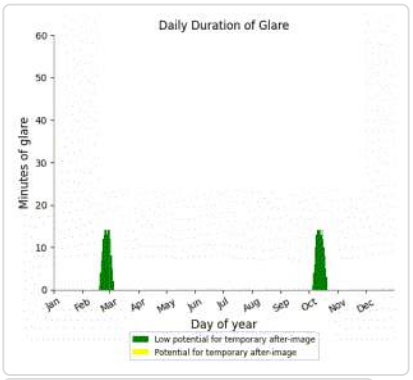
No glare found

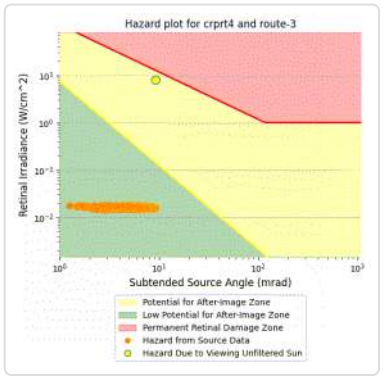
CRPRT4: Route 3

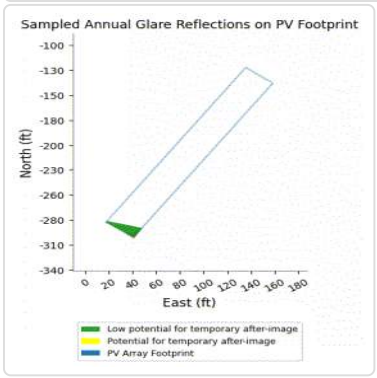
PV array is expected to produce the following glare for this receptor:

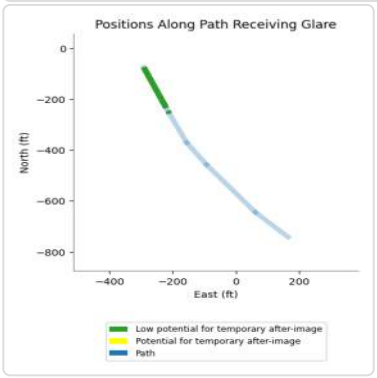
- 311 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







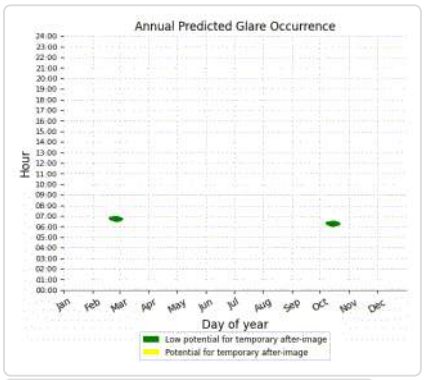


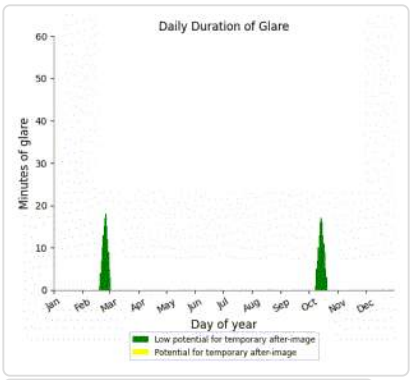


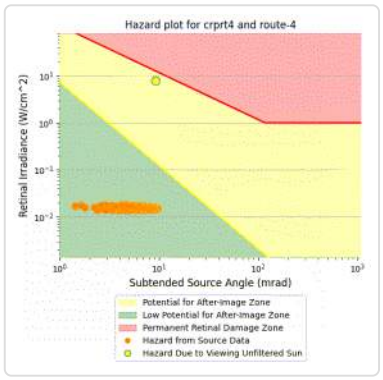
CRPRT4: Route 4

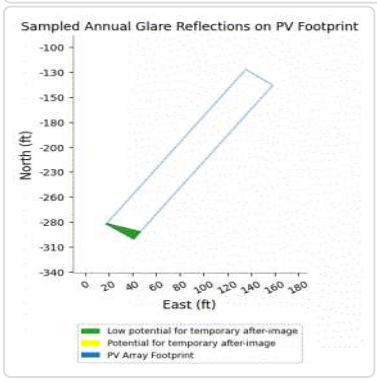
PV array is expected to produce the following glare for this receptor:

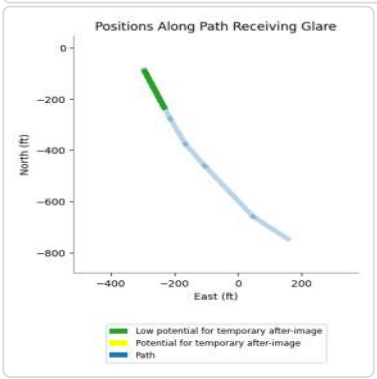
- 255 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT4: Route 5

No glare found

CRPRT4: Route 6

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_10Tilt_124Carports_Obstrctns_2ATCT_NoPlant

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112717.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results

Glare with low potential for temporary after-image predicted

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	236	0	-
CRPRT4	0.0	124.0	566	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	10.0	214.0	0	0	-
SMBLDG	10.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 10.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083343	-70.803962	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	236	0	-	-
CRPRT4	0.0	124.0	566	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	10.0	214.0	0	0	-	-
SMBLDG	10.0	214.0	0	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
crprt3 (green)	0	87	0	0	0	0	0	0	0	85	0	0
crprt3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt4 (green)	0	139	48	0	0	0	0	0	0	186	0	0
crprt4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT3 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	79	0
Route: Route 4	157	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT3: 1-ATCT

No glare found

CRPRT3: OP 2

No glare found

CRPRT3: OP 3

No glare found

CRPRT3: OP 4

No glare found

CRPRT3: OP 5

No glare found

CRPRT3: 6-ATCT

No glare found

CRPRT3: OP 7

No glare found

CRPRT3: Route 1

No glare found

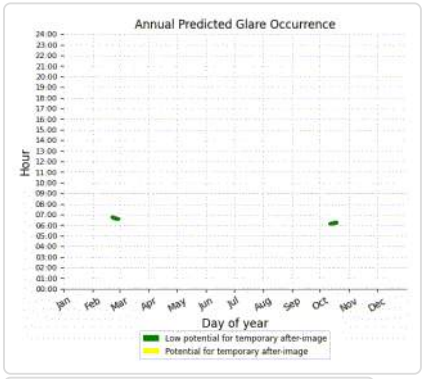
CRPRT3: Route 2

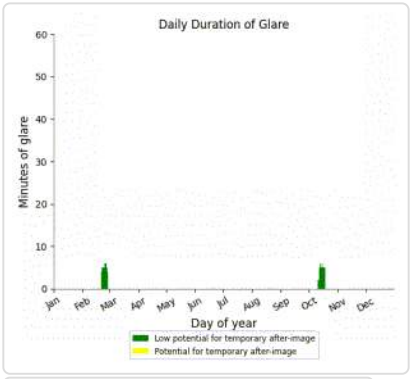
No glare found

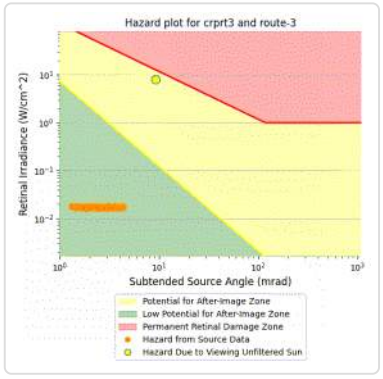
CRPRT3: Route 3

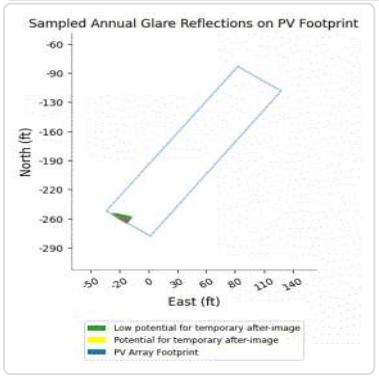
PV array is expected to produce the following glare for this receptor:

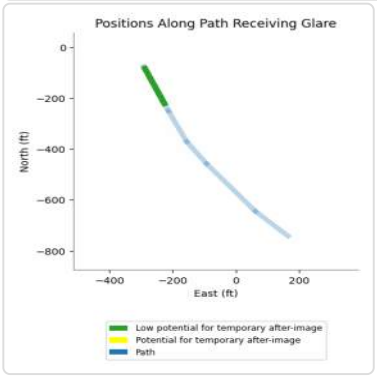
- 79 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







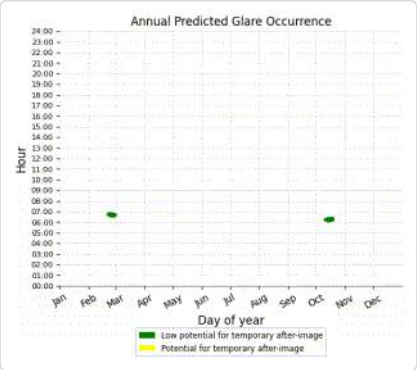


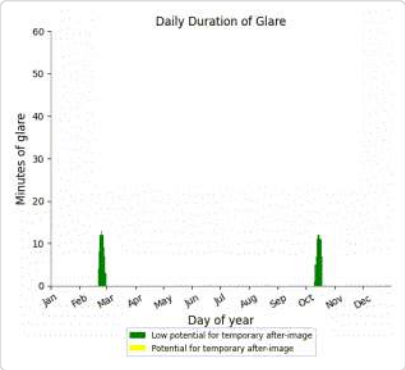


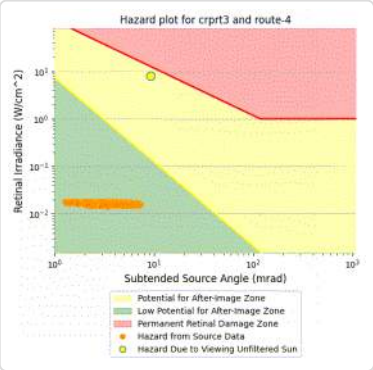
CRPRT3: Route 4

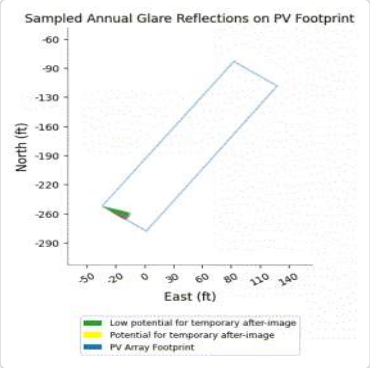
PV array is expected to produce the following glare for this receptor:

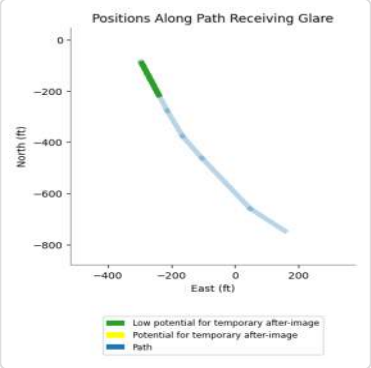
- 157 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT3: Route 5

No glare found

CRPRT3: Route 6

No glare found

CRPRT4 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	311	0
Route: Route 4	255	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT4: 1-ATCT

No glare found

CRPRT4: OP 2

No glare found

CRPRT4: OP 3

No glare found

CRPRT4: OP 4

No glare found

CRPRT4: OP 5

No glare found

CRPRT4: 6-ATCT

No glare found

CRPRT4: OP 7

No glare found

CRPRT4: Route 1

No glare found

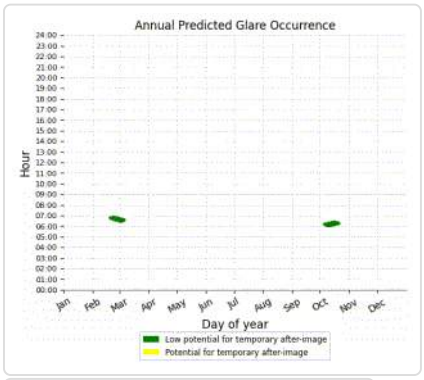
CRPRT4: Route 2

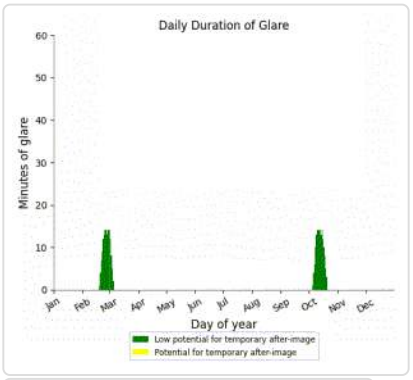
No glare found

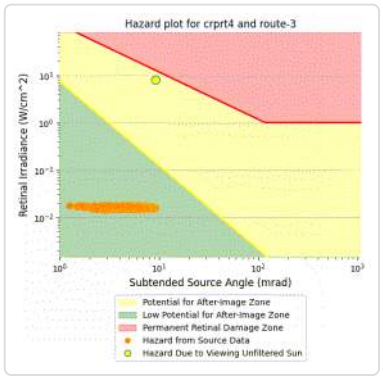
CRPRT4: Route 3

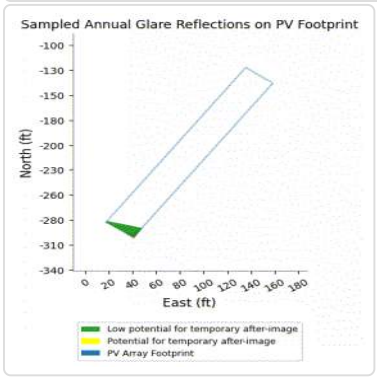
PV array is expected to produce the following glare for this receptor:

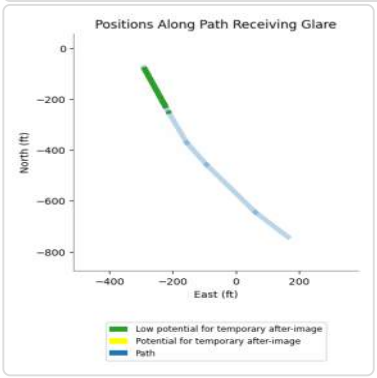
- 311 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







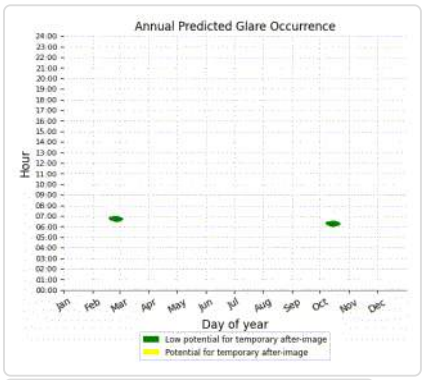


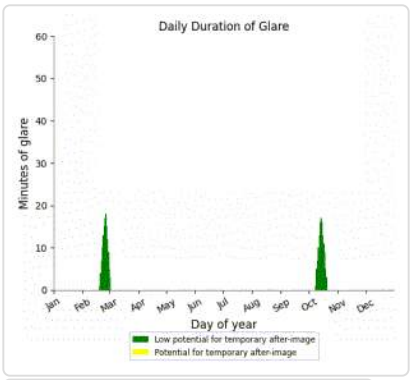


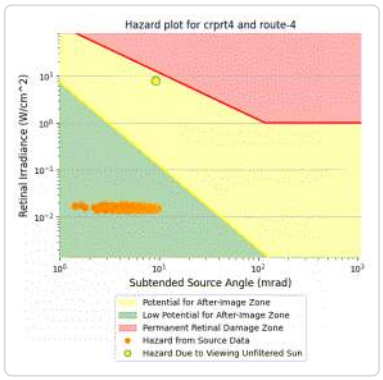
CRPRT4: Route 4

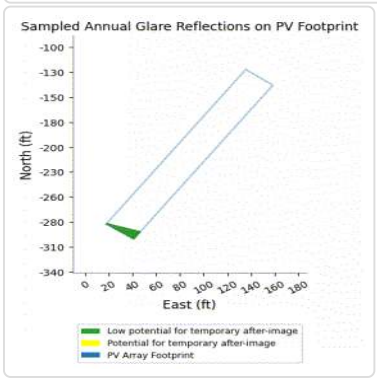
PV array is expected to produce the following glare for this receptor:

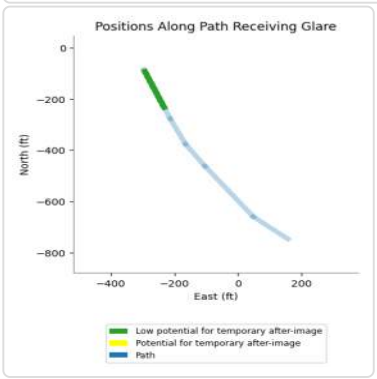
- 255 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT4: Route 5

No glare found

CRPRT4: Route 6

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_13Tilt_124Carports_Obstrctns_2ATCT_NoPlant

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112727.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results

Glare with low potential for temporary after-image predicted

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	236	0	-
CRPRT4	0.0	124.0	566	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	13.0	214.0	0	0	-
SMBLDG	13.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 13.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 13.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083343	-70.803962	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	236	0	-	-
CRPRT4	0.0	124.0	566	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	13.0	214.0	0	0	-	-
SMBLDG	13.0	214.0	0	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
crprt3 (green)	0	87	0	0	0	0	0	0	0	85	0	0
crprt3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt4 (green)	0	139	48	0	0	0	0	0	0	186	0	0
crprt4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT3 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	79	0
Route: Route 4	157	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT3: 1-ATCT

No glare found

CRPRT3: OP 2

No glare found

CRPRT3: OP 3

No glare found

CRPRT3: OP 4

No glare found

CRPRT3: OP 5

No glare found

CRPRT3: 6-ATCT

No glare found

CRPRT3: OP 7

No glare found

CRPRT3: Route 1

No glare found

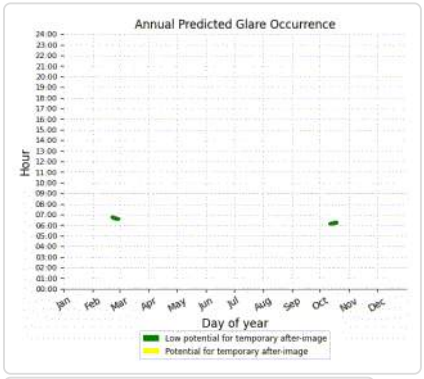
CRPRT3: Route 2

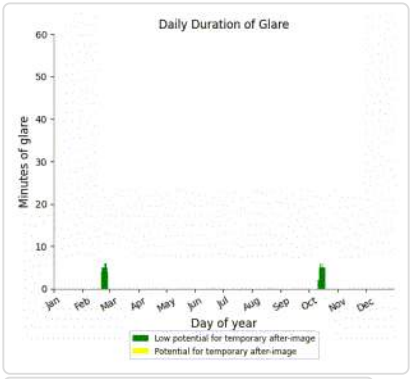
No glare found

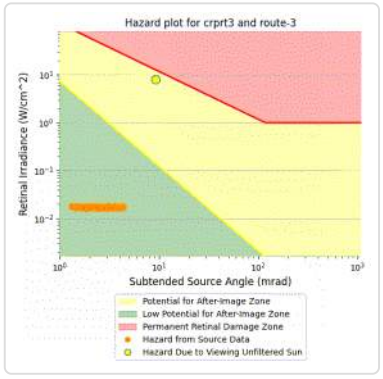
CRPRT3: Route 3

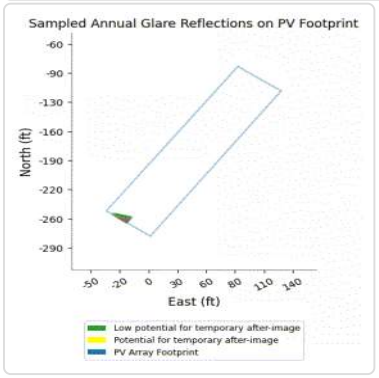
PV array is expected to produce the following glare for this receptor:

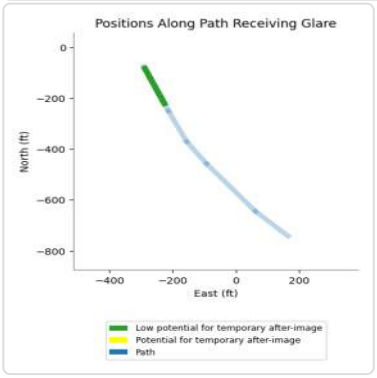
- 79 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







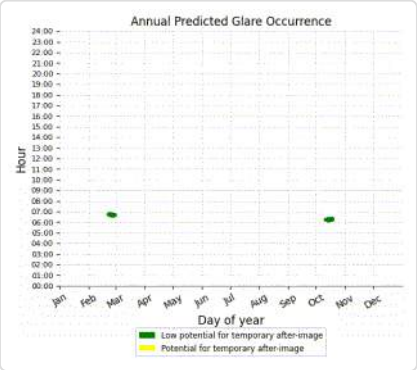


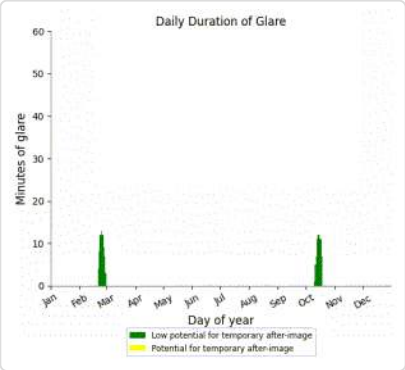


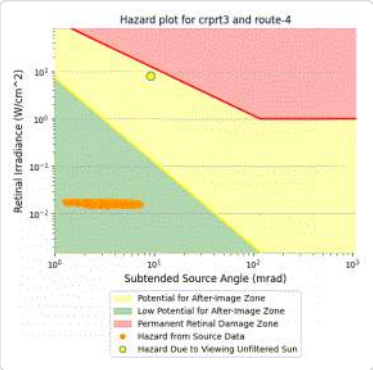
CRPRT3: Route 4

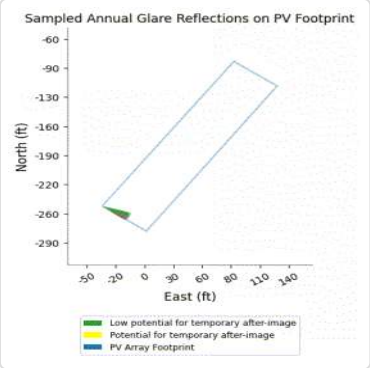
PV array is expected to produce the following glare for this receptor:

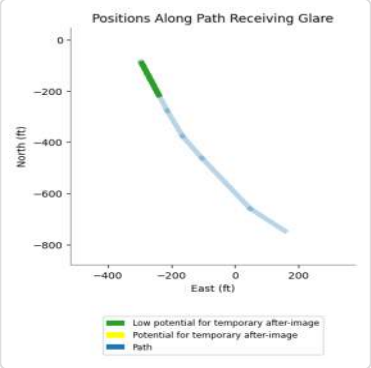
- 157 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT3: Route 5

No glare found

CRPRT3: Route 6

No glare found

CRPRT4 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	311	0
Route: Route 4	255	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT4: 1-ATCT

No glare found

CRPRT4: OP 2

No glare found

CRPRT4: OP 3

No glare found

CRPRT4: OP 4

No glare found

CRPRT4: OP 5

No glare found

CRPRT4: 6-ATCT

No glare found

CRPRT4: OP 7

No glare found

CRPRT4: Route 1

No glare found

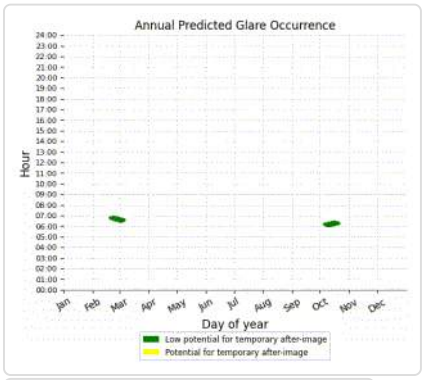
CRPRT4: Route 2

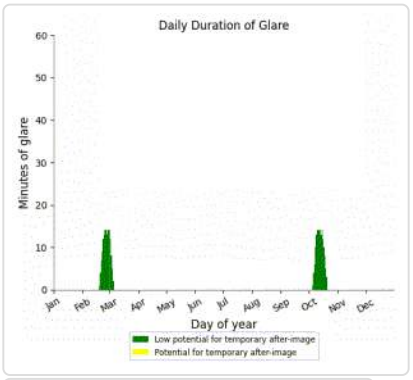
No glare found

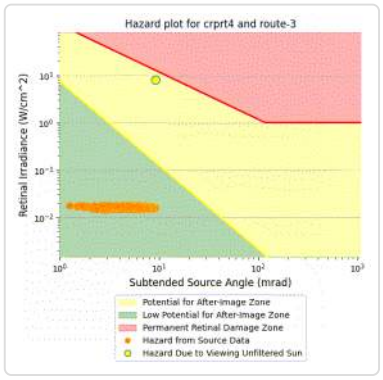
CRPRT4: Route 3

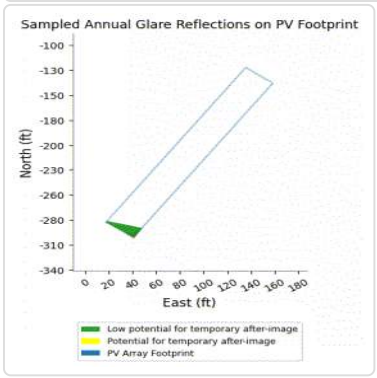
PV array is expected to produce the following glare for this receptor:

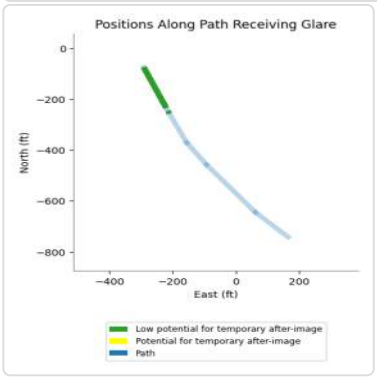
- 311 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







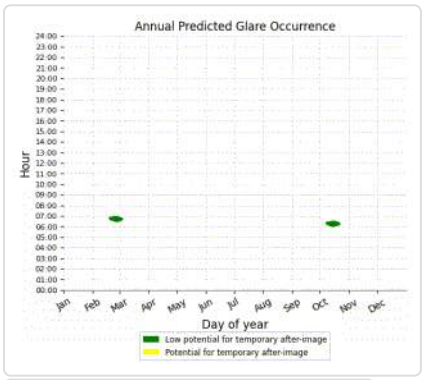


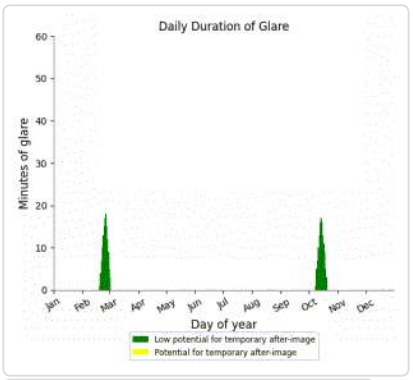


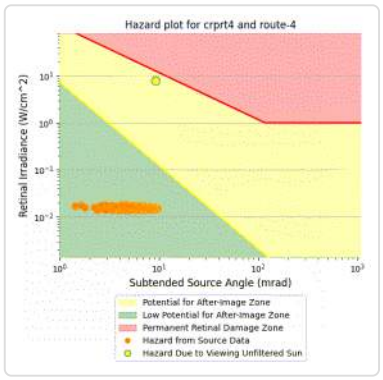
CRPRT4: Route 4

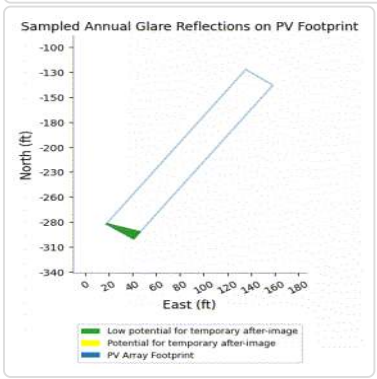
PV array is expected to produce the following glare for this receptor:

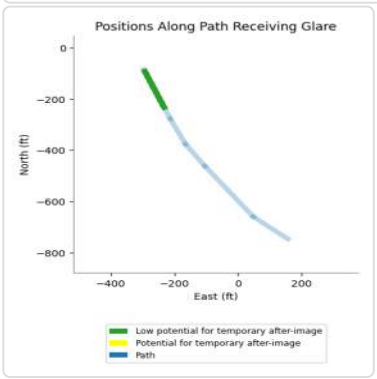
- 255 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT4: Route 5

No glare found

CRPRT4: Route 6

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

ALBACORE, Portsmouth, NH

ALBCR_15Tilt_124Carports_Obstrctns_2ATCT_NoPlant

Client: Lonza

Created Feb 22, 2024
Updated Feb 22, 2024
Time-step 1 minute
Timezone offset UTC-5
Minimum sun altitude 0.0 deg
Site ID 112723.19298

Project type Advanced
Project status: active
Category 1 MW to 5 MW

Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results

Glare with low potential for temporary after-image predicted

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
CRPRT1	0.0	124.0	0	0	-
CRPRT2	0.0	124.0	0	0	-
CRPRT3	0.0	124.0	236	0	-
CRPRT4	0.0	124.0	566	0	-
CRPRT5	0.0	214.0	0	0	-
LGBLDG	15.0	214.0	0	0	-
SMBLDG	15.0	214.0	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 3.1 acres

Name: CRPRT1
Footprint area: 0.20 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085650	-70.803723	57.92	20.17	78.09
2	43.085595	-70.803619	57.81	14.00	71.81
3	43.085032	-70.804187	64.54	14.00	78.54
4	43.085084	-70.804291	66.68	20.17	86.85

Name: CRPRT2
Footprint area: 0.26 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085519	-70.803626	57.88	22.48	80.36
2	43.085431	-70.803461	56.75	14.00	70.75
3	43.084981	-70.803912	58.98	14.00	72.98
4	43.085070	-70.804083	59.73	22.48	82.20

Name: CRPRT3
Footprint area: 0.23 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085400	-70.803418	56.90	22.48	79.38
2	43.085325	-70.803271	56.23	14.00	70.23
3	43.084876	-70.803716	58.56	14.00	72.56
4	43.084953	-70.803866	59.01	22.48	81.49

Name: CRPRT4
Footprint area: 0.13 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 124.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085298	-70.803223	56.02	20.17	76.19
2	43.085253	-70.803139	56.21	14.00	70.21
3	43.084808	-70.803572	58.45	14.00	72.45
4	43.084851	-70.803658	58.35	20.17	78.52

Name: CRPRT5
Footprint area: 0.07 acre
Axis tracking: Fixed (no rotation)
Tilt: 0.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085549	-70.803405	56.86	20.17	77.02
2	43.085404	-70.803116	55.16	20.17	75.32
3	43.085334	-70.803188	55.25	14.00	69.25
4	43.085478	-70.803470	57.01	14.00	71.01

Name: LGBLDG
Footprint area: 2.0 acres
Axis tracking: Fixed (no rotation)
Tilt: 15.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084344	-70.802133	51.60	93.83	145.44
2	43.084054	-70.801543	49.18	93.83	143.01
3	43.083901	-70.801690	49.39	93.83	143.22
4	43.083859	-70.801609	49.20	93.83	143.03
5	43.083897	-70.801574	49.27	93.83	143.10
6	43.083839	-70.801453	47.35	93.83	141.18
7	43.083345	-70.801919	51.93	93.83	145.76
8	43.083906	-70.803019	59.40	93.83	153.23
9	43.084395	-70.802537	54.24	93.83	148.07
10	43.084315	-70.802368	51.53	93.83	145.36
11	43.084337	-70.802347	51.04	93.83	144.87
12	43.084303	-70.802278	52.48	93.83	146.31
13	43.084336	-70.802245	52.51	93.83	146.34
14	43.084297	-70.802171	51.69	93.83	145.52

Name: SMBLDG
Footprint area: 0.22 acre
Axis tracking: Fixed (no rotation)
Tilt: 15.0 deg
Orientation: 214.0 deg

Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084480	-70.803051	56.19	88.00	144.19
2	43.084450	-70.803081	56.31	88.00	144.31
3	43.084506	-70.803193	56.74	88.00	144.74
4	43.084466	-70.803232	56.81	88.00	144.81
5	43.084412	-70.803118	56.55	88.00	144.55
6	43.084252	-70.803275	58.91	88.00	146.91
7	43.084414	-70.803594	61.58	88.00	149.58
8	43.084643	-70.803375	58.79	88.00	146.79

Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082607	-70.800659	43.16	4.50	47.66
2	43.082965	-70.800254	39.75	4.50	44.25
3	43.084118	-70.798835	40.69	4.50	45.19

Name: Route 2
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.084096	-70.798795	40.76	8.50	49.26
2	43.082949	-70.800223	39.72	8.50	48.22
3	43.082597	-70.800616	42.88	8.50	51.38

Name: Route 3
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.085442	-70.804811	63.97	4.50	68.47
2	43.084962	-70.804519	67.50	4.50	72.00
3	43.084962	-70.804519	67.50	4.50	72.00
4	43.084630	-70.804302	69.07	4.50	73.57
5	43.084630	-70.804302	69.07	4.50	73.57
6	43.084394	-70.804068	68.75	4.50	73.25
7	43.083881	-70.803489	64.40	4.50	68.90
8	43.083614	-70.803103	60.85	4.50	65.35

Name: Route 4
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.083602	-70.803135	60.76	8.50	69.26
2	43.083841	-70.803542	64.38	8.50	72.88
3	43.084382	-70.804111	68.76	8.50	77.26
4	43.084618	-70.804339	69.09	8.50	77.59
5	43.084618	-70.804339	69.09	8.50	77.59
6	43.084888	-70.804519	67.86	8.50	76.36
7	43.084888	-70.804519	67.86	8.50	76.36
8	43.085416	-70.804830	64.17	8.50	72.67

Name: Route 5
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082313	-70.799503	41.53	4.50	46.03
2	43.082995	-70.798326	37.86	4.50	42.36

Name: Route 6
Route type Two-way
View angle: 50.0 deg

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	43.082966	-70.798285	37.86	8.50	46.36
2	43.082274	-70.799457	41.51	8.50	50.01

Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
1-ATCT	43.084384	-70.818882	89.93	130.00	219.93
OP 2	43.082455	-70.800057	42.02	20.00	62.02
OP 3	43.082529	-70.799934	41.99	30.00	71.99
OP 4	43.083085	-70.799471	39.01	6.00	45.01
OP 5	43.083191	-70.799294	38.75	15.00	53.75
6-ATCT	43.084349	-70.818856	89.97	120.00	209.97
OP 7	43.083343	-70.803962	70.10	40.00	110.10

1-ATCT map image

6-ATCT map image

Obstruction Components

Name: BLDG2
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084955	-70.806346	99.52
2	43.085031	-70.806408	98.08
3	43.084866	-70.806801	99.55
4	43.084555	-70.806565	99.98
5	43.084608	-70.806439	99.85
6	43.084444	-70.806325	99.64
7	43.084592	-70.806011	99.08
8	43.084965	-70.806346	99.43

Name: HighEdge1
Upper edge height: 22.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085534	-70.803609	57.89
2	43.085267	-70.803116	55.50

Name: HighEdge2
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085593	-70.803598	57.75
2	43.085019	-70.804161	63.07

Name: HighEdge3
Upper edge height: 22.5 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085424	-70.803445	56.71
2	43.084960	-70.803895	59.16

Name: HighEdge4
Upper edge height: 20.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085307	-70.803260	56.28
2	43.084860	-70.803684	58.42

Name: PRPT1
Upper edge height: 93.2 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084674	-70.803390	58.96
2	43.084478	-70.802983	56.11
3	43.084211	-70.803240	59.29
4	43.084415	-70.803648	62.46
5	43.084674	-70.803390	58.96

Name: PRPT2
Upper edge height: 99.3 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084580	-70.802457	53.31
2	43.083953	-70.801212	46.09
3	43.083224	-70.801856	52.36
4	43.083866	-70.803165	61.10
5	43.084580	-70.802457	53.31

Name: TREELINE
Upper edge height: 35.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085164	-70.808848	82.83
2	43.085454	-70.807942	81.22
3	43.085373	-70.807765	82.86
4	43.085040	-70.807564	86.97

Name: Trees
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083891	-70.811509	72.86
2	43.084095	-70.811240	67.62

Name: Trees
Upper edge height: 17.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085036	-70.807176	92.20
2	43.084131	-70.806567	95.41

Name: Trees1
Upper edge height: 40.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085261	-70.816979	84.00
2	43.084955	-70.816877	84.48
3	43.084477	-70.817247	78.24

Name: Trees2
Upper edge height: 60.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084443	-70.818109	84.34
2	43.084602	-70.818167	84.74
3	43.084354	-70.818474	88.75

Name: Trees3
Upper edge height: 100.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084287	-70.810576	72.89
2	43.084550	-70.810195	75.28

Name: Trees4
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085793	-70.815175	77.90
2	43.085354	-70.814585	81.00
3	43.086098	-70.812858	77.64

Name: Trees5
Upper edge height: 45.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084411	-70.807233	89.30
2	43.084554	-70.807316	89.33
3	43.084677	-70.807358	89.54
4	43.084730	-70.807552	87.97

Name: Trees6
Upper edge height: 20.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085286	-70.814633	80.07
2	43.083793	-70.813418	79.96

Name: Trees7
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.083527	-70.812571	74.50
2	43.083829	-70.811932	72.49

Name: WRHSE1
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.085129	-70.813496	81.26
2	43.085227	-70.813254	81.50
3	43.085137	-70.813085	81.35
4	43.084986	-70.813064	81.23
5	43.084886	-70.813292	81.62
6	43.085129	-70.813496	81.26

Name: WRHSE2
Upper edge height: 30.0 ft

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	43.084916	-70.813107	81.43
2	43.084740	-70.813499	81.62
3	43.084705	-70.813466	81.64
4	43.084630	-70.813662	81.71
5	43.084174	-70.813292	81.76
6	43.084399	-70.812785	81.68
7	43.084501	-70.812860	81.70
8	43.084540	-70.812758	81.66
9	43.084916	-70.813107	81.43

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
CRPRT1	0.0	124.0	0	0	-	-
CRPRT2	0.0	124.0	0	0	-	-
CRPRT3	0.0	124.0	236	0	-	-
CRPRT4	0.0	124.0	566	0	-	-
CRPRT5	0.0	214.0	0	0	-	-
LGBLDG	15.0	214.0	0	0	-	-
SMBLDG	15.0	214.0	0	0	-	-

Distinct glare per month

Excludes overlapping glare from PV array for multiple receptors at matching time(s)

PV	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
crprt3 (green)	0	87	0	0	0	0	0	0	0	85	0	0
crprt3 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0
crprt4 (green)	0	139	48	0	0	0	0	0	0	186	0	0
crprt4 (yellow)	0	0	0	0	0	0	0	0	0	0	0	0

PV & Receptor Analysis Results

Results for each PV array and receptor

CRPRT1 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT2 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

CRPRT3 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	79	0
Route: Route 4	157	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT3: 1-ATCT

No glare found

CRPRT3: OP 2

No glare found

CRPRT3: OP 3

No glare found

CRPRT3: OP 4

No glare found

CRPRT3: OP 5

No glare found

CRPRT3: 6-ATCT

No glare found

CRPRT3: OP 7

No glare found

CRPRT3: Route 1

No glare found

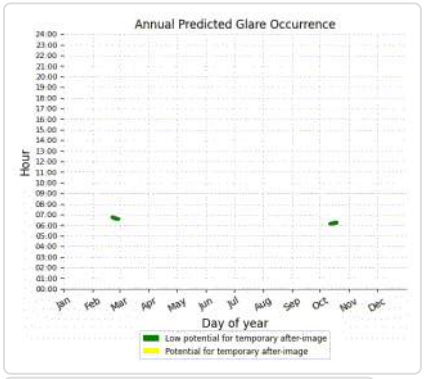
CRPRT3: Route 2

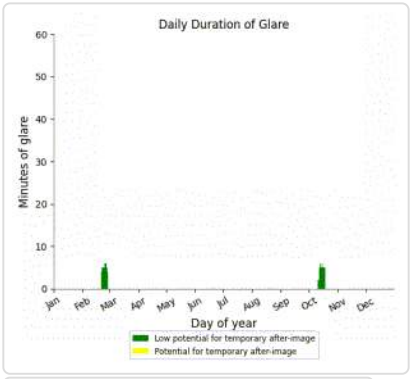
No glare found

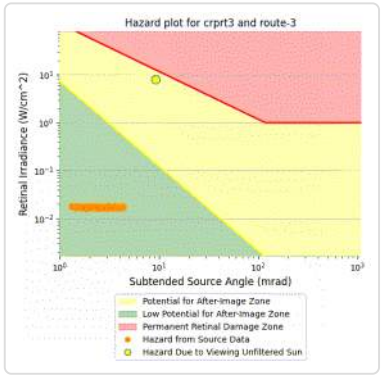
CRPRT3: Route 3

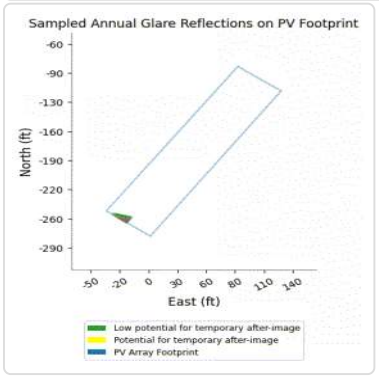
PV array is expected to produce the following glare for this receptor:

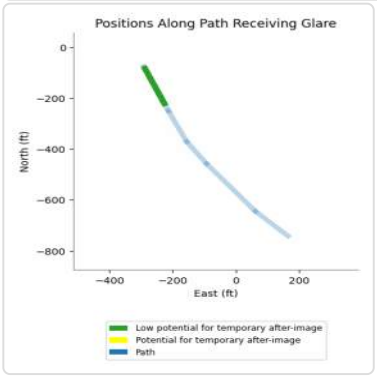
- 79 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







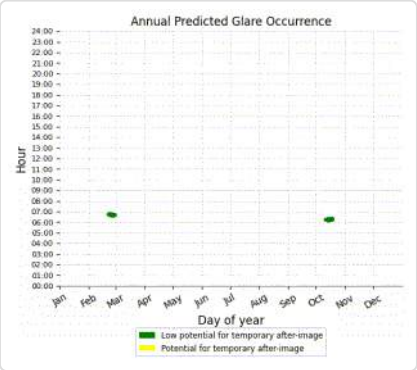


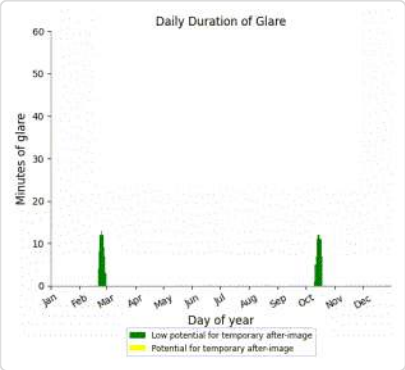


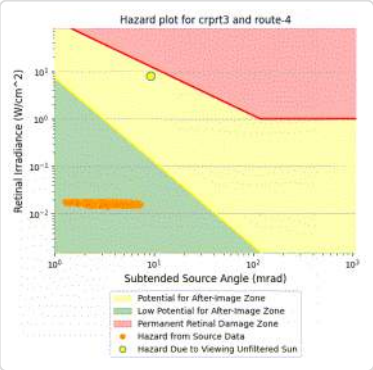
CRPRT3: Route 4

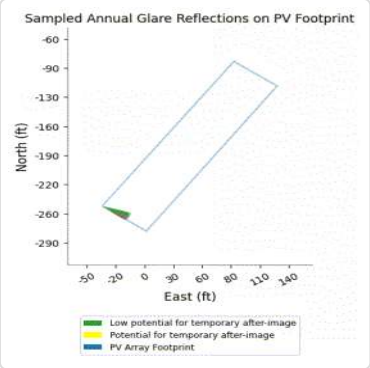
PV array is expected to produce the following glare for this receptor:

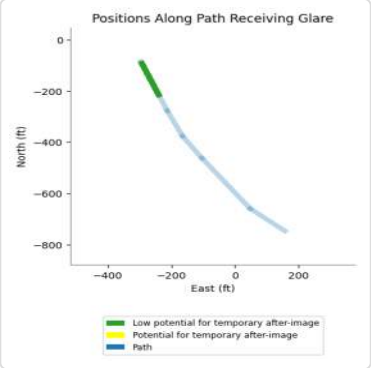
- 157 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT3: Route 5

No glare found

CRPRT3: Route 6

No glare found

CRPRT4 low potential for temporary after-image

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	311	0
Route: Route 4	255	0
Route: Route 5	0	0
Route: Route 6	0	0

CRPRT4: 1-ATCT

No glare found

CRPRT4: OP 2

No glare found

CRPRT4: OP 3

No glare found

CRPRT4: OP 4

No glare found

CRPRT4: OP 5

No glare found

CRPRT4: 6-ATCT

No glare found

CRPRT4: OP 7

No glare found

CRPRT4: Route 1

No glare found

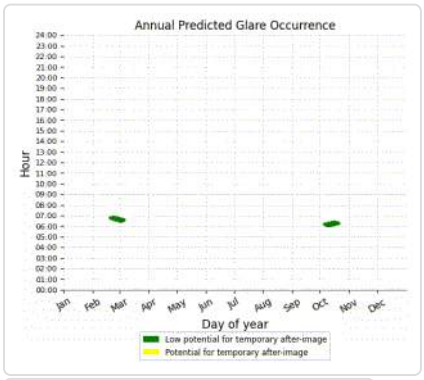
CRPRT4: Route 2

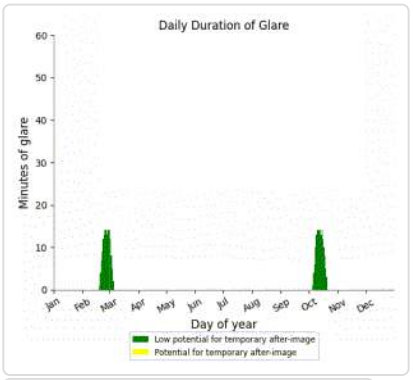
No glare found

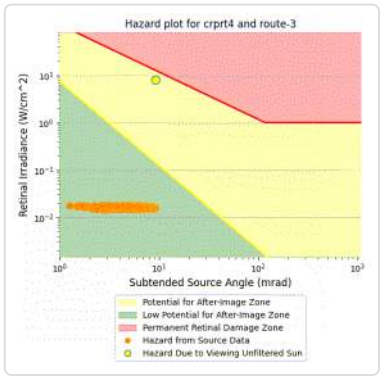
CRPRT4: Route 3

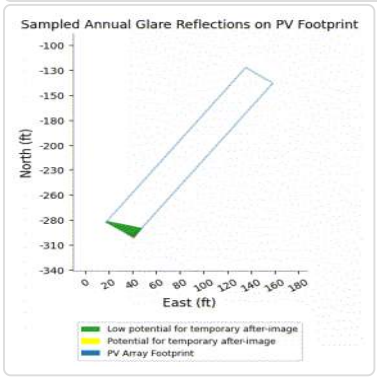
PV array is expected to produce the following glare for this receptor:

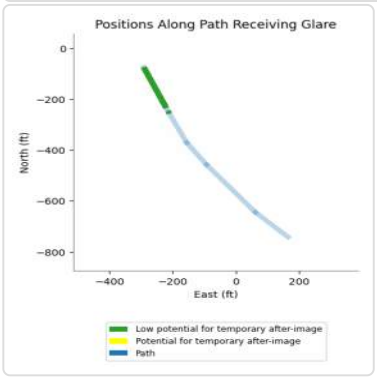
- 311 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.







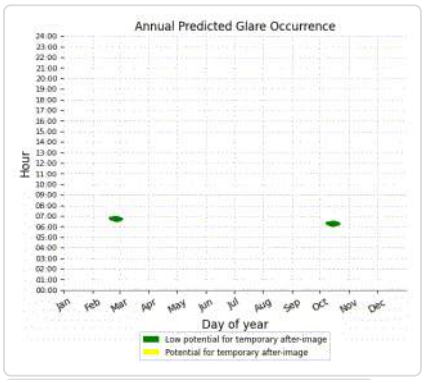


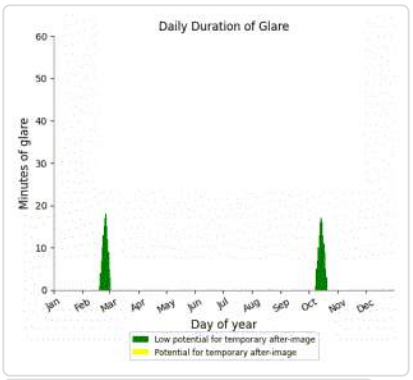


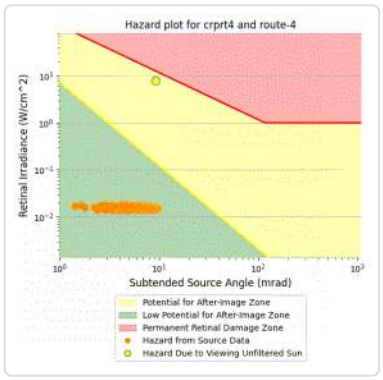
CRPRT4: Route 4

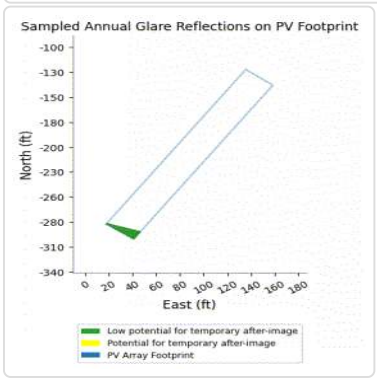
PV array is expected to produce the following glare for this receptor:

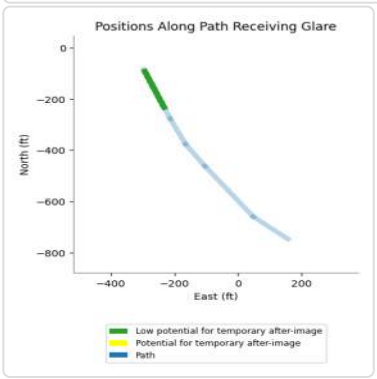
- 255 minutes of "green" glare with low potential to cause temporary after-image.
- 0 minutes of "yellow" glare with potential to cause temporary after-image.











CRPRT4: Route 5

No glare found

CRPRT4: Route 6

No glare found

CRPRT5 no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

LGBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

SMBLDG no glare found

Component	Green glare (min)	Yellow glare (min)
OP: 1-ATCT	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
OP: OP 5	0	0
OP: 6-ATCT	0	0
OP: OP 7	0	0
Route: Route 1	0	0
Route: Route 2	0	0
Route: Route 3	0	0
Route: Route 4	0	0
Route: Route 5	0	0
Route: Route 6	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographi obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for larg PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, nc discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

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Civil/Site • Traffic/Transportation • Governmental • Survey/Geospatial
Infrastructure • Geotechnical/Environmental • Telecommunications • Utilities/Energy

Findings of Fact | Wetland Conditional Use Permit
City of Portsmouth Planning Board

Date: July 18, 2024
Property Address: 50 Andrew Jarvis Dr.
Application #: LU-24-50
Decision: □ Approve □ Deny □ Approve with Conditions

Findings of Fact:

Per RSA 676:3, I: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of all conditions necessary to obtain final approval.

In order to grant Wetland Conditional Use permit approval the Planning Board shall find the application satisfies criteria set forth in the Section 10.1017.50 (Criteria for Approval) of the Zoning Ordinance.

	Zoning Ordinance Sector 10.1017.50 Criteria for Approval	**Finding** **(Meets Criteria for Approval)**	**Supporting Information**
1	*1. The land is reasonably suited to the use activity or alteration.*	**Meets** **Does Not Meet**	This area is already heavily used as a recreation area for high school students and other recreation leagues. The addition of baseball/softball equipment will allow for more teams to utilize the space.
2	2. *There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration.*	**Meets** **Does Not Meet**	While there is an alternative location in this area that would create minimal disturbance and be outside the buffer, it would create a safety hazard due to its proximity to buildings and parking areas. The chosen location within the buffer is already used as a recreational field and it does not receive any harmful maintenance such as fertilizer or chemical use, only occasional mowing. The conversion to a baseball/softball field will not change how the buffer has been used historically.

	Zoning Ordinance Sector 10.1017.50 Criteria for Approval	Finding (Meets Criteria for Approval)	Supporting Information
3	*3. There will be no adverse impact on the wetland functional values of the site or surrounding properties.*	**Meets** **Does Not Meet**	The infield mix proposed for the new field will be a permeable mix that should not have a noticeable impact on infiltration within this buffer area. The adjacent wetland is well forested and should not see an impact from this field conversion.
4	*4. Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.*	**Meets** **Does Not Meet**	The only vegetation proposed to be removed is a portion of existing grass lawn. This will be replaced with a permeable sand/silt/clay infield mix.
5	*5. The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this section.*	**Meets** **Does Not Meet**	The proposal minimizes impacts to the buffer by proposing a permeable infield mix and minimal permanent equipment. On-site alternatives would require greater disturbance to areas that are not already used as recreational fields.
6	*6. Any area within the vegetated buffer strip will be returned to a natural state to the extent feasible.*	**Meets** **Does Not Meet**	No work is proposed within the 25' vegetated buffer.
7	**<u>Other Board Findings:</u>**		

Portsmouth School Department - SAU 52
City Hall, 1 Junkins Ave. Suite 402
Portsmouth, NH 03801

Date: April 9, 2024

To: Wetland Conservation Committee

From: Ken Linchey, Director of Building's and Ground's

Re: Tennis Courts Walkthrough Questions

The Portsmouth High Schools Athletic Department is requesting permission to enhance the usage of one their practice fields. The softball and baseball teams are always juggling field usage between the high school fields, Granite Street softball field, Leary field, and Cough field. Making changes to this practice field will allow some relief to the scheduling and practice needs for all of Portsmouth School programs.

Project details:

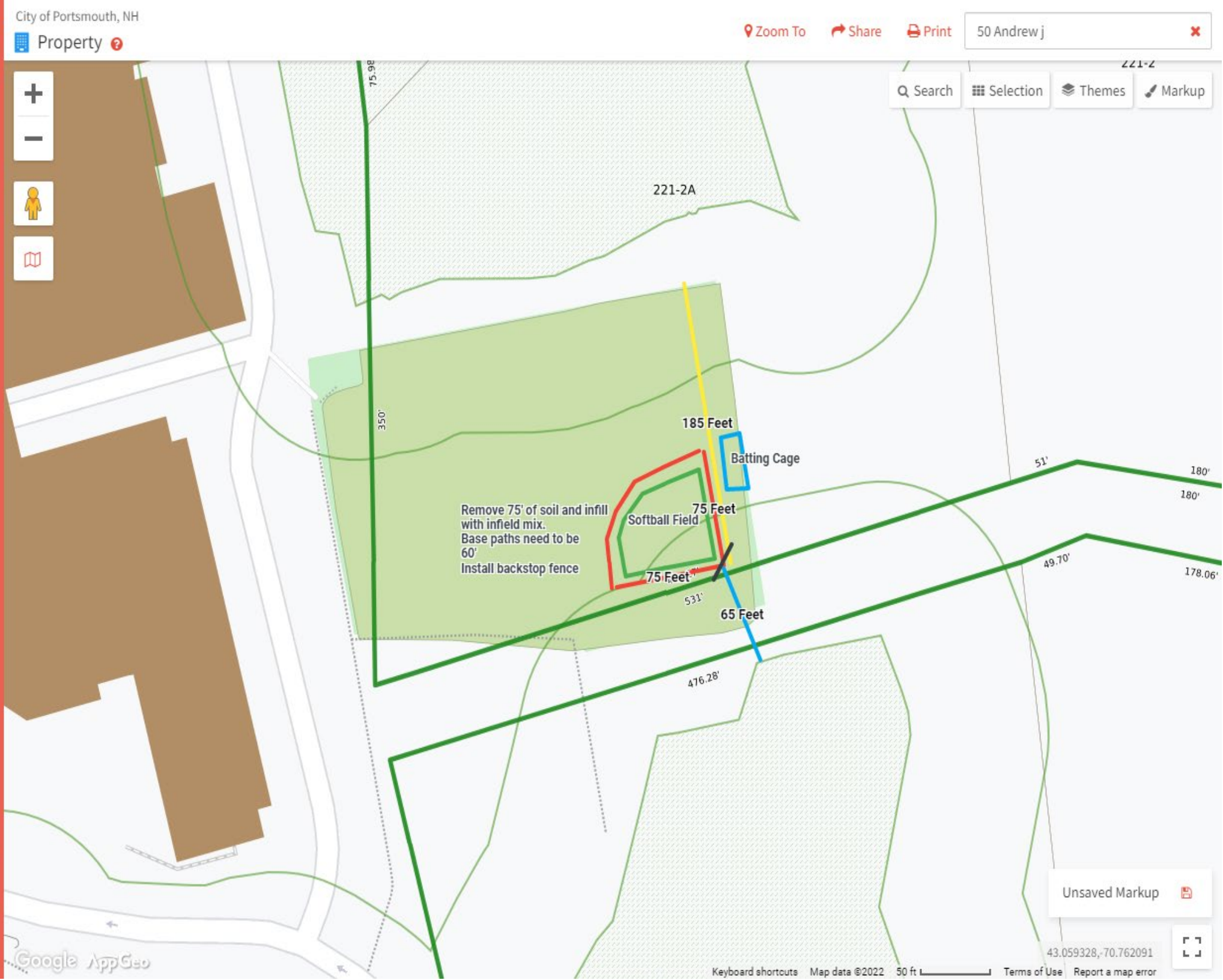
- Remove 3" of sod & loam to create a skinned infield diamond.
- Replaced skinned area with a native infield softball/baseball infield mix. The mixture is made up a clay, silt, and sand.
- Installation of a backstop that would minimize softballs from being hit into the wetland.
- Backstop installation would consist of driving posts into the ground vs using concrete.

In summary, we evaluated how can we accommodate all of our programs within the original field structure year-round. We believe that this is just a slight adjustment with how we layout our field usage within the existing field structure.

Sincerely'

Ken Linchey

Ken Linchey
Portsmouth School Department
Director of Building's & Ground's


City of Portsmouth, NH
Property
Zoom To
Share
Print
50 Andrew j
Search
Selection
Themes
Markup
221-2A
185 Feet
Batting Cage
Remove 75' of soil and infill with infield mix.
Base paths need to be 60'
Install backstop fence
Softball Field
75 Feet
75 Feet
65 Feet
350'
531'
476.28'
51'
180'
180'
49.70'
178.06'
Unsaved Markup
43.059328,-70.762091
Keyboard shortcuts
Map data ©2022
50 ft
Terms of Use
Report a map error
Google
AppGeo


City of Portsmouth, NH
Property
Zoom To
Share
Print
50 Andrew j
Search
Selection
Themes
Markup
221-2A
185 Feet
Batting Cage
Remove 75' of soil and infill with infield mix.
Base paths need to be 60'
Install backstop fence
Softball Field
75 Feet
75 Feet
65 Feet
Unsaved Markup
Google
AppGeo
43.059267,-70.762268
Keyboard shortcuts
Map data ©2022
50 ft
Terms of Use

Findings of Fact | Wetland Conditional Use Permit
City of Portsmouth Planning Board

Date: July 18, 2024
Property Address: 0 Maplewood Ave.
Application #: LU-24-102
Decision: □ Approve □ Deny □ Approve with Conditions

Findings of Fact:

Per RSA 676:3, I: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of all conditions necessary to obtain final approval.

In order to grant Wetland Conditional Use permit approval the Planning Board shall find the application satisfies criteria set forth in the Section 10.1017.50 (Criteria for Approval) of the Zoning Ordinance.

	Zoning Ordinance Sector 10.1017.50 Criteria for Approval	**Finding** (Meets Criteria for Approval)	**Supporting Information**
1	*1. The land is reasonably suited to the use activity or alteration.*	**Meets** **Does Not Meet**	This work is an in-kind repair job. The damaged wall is structurally integral to keeping the cemetery border and fill contained.
2	*2. There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration.*	**Meets** **Does Not Meet**	There is no alternative location to rebuild this wall in. The safety of the tomb and burials behind the wall is reliant on the structure of this wall and it must be fortified in order to prevent further erosion, or worse, collapse.
3	*3. There will be no adverse impact on the wetland functional values of the site or surrounding properties.*	**Meets** **Does Not Meet**	The applicant used professional services to access the area and wall from the adjacent property, so as not to disturb the hallowed ground. This may have impacts on the pathway of any necessary construction vehicles. The applicant shall restore any disturbed soils with native wetland buffer conservation seed mix and monitor for establishment.

	Zoning Ordinance Sector 10.1017.50 Criteria for Approval	Finding (Meets Criteria for Approval)	Supporting Information
4	*4. Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.*	**Meets** **Does Not Meet**	The natural vegetated state was disturbed in order to get construction equipment onto the site. This area should be stabilized with erosion controls, along with the wall, and should be reseeded at the end of construction with a native wetland buffer conservation seed mix.
5	*5. The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this section.*	**Meets** **Does Not Meet**	The alternatives to not repairing this wall would be allowing it, and the fill, and historic infrastructure to erode and/or slide into the North Mill Pond. The repair of this wall was an emergency repair.
6	*6. Any area within the vegetated buffer strip will be returned to a natural state to the extent feasible.*	**Meets** **Does Not Meet**	All areas disturbed within the 25' vegetated buffer shall be reseeded at the end of construction with a native wetland buffer conservation seed mix.
7	**<u>Other Board Findings:</u>**		

City of Portsmouth

Department of Public Works

MEMORANDUM

TO: Samantha Collins, Conservation Commission Chair

CC: Peter Britz, Director of Planning and Sustainability
Kate Homet, Associate Environmental Planner

FROM: Christine Sproviero, Project Manager

DATE: June 7, 2024

SUBJECT: Union Cemetery Emergency Shore Wall Repair

The Union Cemetery shore wall has sustained damage and erosion over multiple years due to large storm and tidal events. On 4/26/24, it was observed that multiple sections of the wall have fallen into the tidal area below. The City immediately filed a wetlands emergency authorization request to the New Hampshire Department of Environmental Services (NHDES) to perform repairs on the 41' section of shore wall, as shown in the plans attached, before further degradation occurs. The City received authorization from NHDES on 5/16/24 which is attached. Once authorization was granted, the City engaged Riverside & Pickering Marine Contractors to schedule the emergency repair "in kind" work which is scheduled to begin on 6/10/24. Following the completion of the re-construction of the wall, the City will submit post work photos as required by the Emergency Authorization.

Kind Regards,

Christine Sproviero

Department of Public Works
680 Peverly Hill Road
Portsmouth, New Hampshire 03801

TIDAL RELATIONSHIPS:
IN FEET TO NAVD88 DATUM, 1983–2001 TIDAL EPOCH
REF: NOAA TIDE GAUGE STA 8419870
FEMA 1% +50 YR SLR = 8.3'
FEMA 1% = 8'
HOTL = 3.88' (OBS. 8–21–23)
MHHW = 4.18'
MHW = 3.76'
NAVD88 EL = 0.0'
MEAN TIDE LEVEL EL = –0.32'
MLW EL = –4.39'
MLLW EL = –4.71'

CONSTRUCTION SEQUENCE:
1. ALL WORK SHALL BE PERFORMED IN DRY CONDITIONS WORKING ABOVE WATER LEVELS.
2. NO SOIL EXCAVATION IS ANTICIPATED. IF SOIL DISTURBANCE OCCURS, INSTALL EROSION CONTROL SOCK ALONG THE TOE OF A WORK AREA AND MAINTAIN IT UNTIL STABILIZED. REMOVE EROSION CONTROL SOCK WHEN THE ASSOCIATED WORK IS COMPLETE.
3. STABILIZE PLACED BACKFILL WITH LOAM AND SEED, WATER UNTIL ESTABLISHED.

STATE OF NEW HAMPSHIRE
DUNCAN G. MELLOR
No. 8344
LICENSED
PROFESSIONAL ENGINEER

40 0 40 80
(FEET)

GNE
CIVILWORKS NEW ENGLAND
CIVIL & WATERFRONT ENGINEERING
181 Watson Road, PO Box 1186
Dover, New Hampshire 03821
603.749.0443

DATE: 5–23–24
SCALE: SHOWN
DRAWN BY: DCM
DESIGN BY: DCM

SITE PLAN

CITY OF PORTSMOUTH
UNION CEMETERY
MAPLEWOOD AVENUE
TAX MAP 124, LOT 3

UNION CEMETERY
SEAWALL REPAIRS
PORTSMOUTH, NH
ROCKINGHAM COUNTY
NORTH MILL POND

WF - 1

SCOPE OF REPAIRS:

1. EXISTING STONE WALL IS DAMAGED WITH SOME BACKFILL EROSION.
2. IMPORT NEW WALL STONES MATCHING EXISTING FOR REPAIRS.
3. REBUILD UPPER WALL WITH DRY SET STONEWORK FROM REMAINING WALL UP TO THE CREST ELEVATION OF THE GRANITE SLABS ADJACENT TO CRYPT.
4. INSTALL 8 OZ/SY NON-WOVEN GEOTEXTILE ONTO ERODED BANK.
5. IMPORT AND INSTALL CRUSHED ROCK STRUCTURAL BACKFILL AND WRAP GEOTEXTILE OVER THIS MATERIAL.
6. ADD LOAM AND GRASS SEED TO MATCH ADJACENT GRADES AND SURFACES, WATER UNTIL ESTABLISHED.

STATE OF NEW HAMPSHIRE
DUNCAN C. MELLOR
No. 8344
LICENSED PROFESSIONAL ENGINEER

20 0 20 40 60
(FEET)

CNE
CIVILWORKS NEW ENGLAND
CIVIL & WATERFRONT ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

DATE: 5-23-24
SCALE: SHOWN
DRAWN BY: DCM
DESIGN BY: DCM

CITY OF PORTSMOUTH
UNION CEMETERY
MAPLEWOOD AVENUE
TAX MAP 124, LOT 3

UNION CEMETERY
SEAWALL REPAIRS
PORTSMOUTH, NH
ROCKINGHAM COUNTY
NORTH MILL POND

REPAIR PLAN

WF - 2

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

EMERGENCY AUTHORIZATION VERIFICATION

FILE NUMBER:	**2024-01385**
OWNER:	**CITY OF PORTSMOUTH**
SITE LOCATION:	**UNION CEMETERY MAPLEWOOD AVE, PORTSMOUTH**
AGENT/CONTRACTOR:	**TBD**
AUTHORIZATION DATE:	**MAY 16, 2024**
WATERBODY:	**TIDAL BUFFER ZONE**

This is to confirm that New Hampshire Department of Environmental Services (NHDES) Wetlands Bureau has given emergency authorization in accordance with NH Administrative Rule Env-Wt 315 to the owner/agent to conduct the following work in the NHDES Wetlands Bureau jurisdiction (under RSA 482-A):

DESCRIPTION: Emergency authorization for the in-kind repair to an existing retaining wall.

This authorization is subject to the following conditions:

1. The applicant/contractor shall file a follow up report describing the work performed under this authorization including pre-construction and post-construction photos to NHDES by June 24, 2024; the need for additional permitting will then be determined by NHDES (if no further impacts are needed).
2. Work shall be conducted in a manner so as to minimize turbidity and sedimentation to surface waters and wetlands.
3. Appropriate siltation, erosion controls, turbidity, and sedimentation controls shall be utilized.
4. Extreme precautions shall be taken within riparian areas to limit unnecessary removal of vegetation for access.
5. Construction equipment shall be inspected daily for leaking fuel, oil, and hydraulic fluid prior to working near surface waters or wetlands.
6. Faulty equipment shall be repaired prior to working near jurisdictional areas.
7. The contractor shall have appropriate oil spill kits on site and readily accessible at all times during construction and each operator shall be trained in its use.
8. This form shall be properly posted at the work site.
9. This authorization does not convey a property right, nor authorize any injury to property of others, nor invasion of rights of others.

THIS AUTHORIZATION EXPIRES ON June 17, 2024. All work must be completed by this date. This authorization has been given file number **2024-01385**. Please use this number in all future correspondence.

Signed:

Eben M. Lewis
Southeast Region Supervisor
Land Resources Management, Water Division

ec: Portsmouth Conservation Commission
US Army Corps of Engineers (Richard.C.Kristoff@usace.army.mil)
NH HSEM Planning (hsemplanning@dos.nh.gov)
NHPA (DOS.nhpa@dos.nh.gov)

Christine R. Sproviero

From: Christine R. Sproviero
Sent: Wednesday, May 22, 2024 9:05 AM
To: Duncan Mellor
Subject: Authorization for Civilworks New England

Good morning Duncan,

Please consider this as an authorization for Civilworks New England to act as an authorized agent for the City of Portsmouth in regard to the Union Cemetery Shore Wall Project.

Regards,

Christine R. Sproviero
Project Manager
City of Portsmouth
Public Works Department
680 Peverly Hill Road
Portsmouth, NH 03801
Office: (603) 766-1755
Mobile: (603) 380-4805
Email: crSproviero@cityofportsmouth.com

CIVILWORKS NEW ENGLAND
181 WATSON ROAD
P.O. BOX 1166
DOVER, NH 03821-1166
PHONE: 603.749.0443

MEMORANDUM

Date: June 25, 2024

To: Portsmouth Planning Board
Re: DES 2024-01385, City of Portsmouth, Union Cemetery wall repairs
From: Duncan Mellor, PE
Civilworks New England

The damaged stone wall at Union Cemetery in Portsmouth on the bank of North Mill Pond has been repaired in-kind with dry set stonework in the Tidal Buffer Zone. All work was performed in the dry and was above and inshore of the high tide line. The disturbed lawn area was seeded with the City wetland buffer seed mix. Concurrently the project was approved by the Portsmouth Conservation Commission (letter attached).

Before Photograph:

Photo 1 Main span removal for localized member removal and observation

After Photographs:

Photo 2 Repaired wall looking north 6-18-24

Photo 3 Disturbed area erosion controls and seeding 6-18-24

CIVILWORKS NEW ENGLAND
181 WATSON ROAD
P.O. BOX 1166
DOVER, NH 03821-1166
PHONE: 603.749.0443

Photo 4 Disturbed area erosion control matting over City wetland buffer seed mix 6-18-24.

In accordance with the Portsmouth Conservation Commission WCUP approval conditions, dated June 17, 2024, this area will be reseeded if growth is not successful, and native wetland buffer shrubs will be planted along the temporary access area.

\\cneserver2\Users\Dmellor\Documents\R&Pickering\Union Cemetery\CUP\Union cemetery completion report 6-25-24.docx

CITY OF PORTSMOUTH
Planning & Sustainability
Department
1 Junkins Avenue
Portsmouth, New
Hampshire 03801
(603) 610-7216

CONSERVATION COMMISSION

June 17, 2024

City of Portsmouth

PO BOX 628
Portsmouth, NH 03802

RE: Wetland Conditional Use Permit for property located at 0 Maplewood Avenue

Dear Owner:

The Conservation Commission, at its regularly scheduled meeting of **Wednesday, June 12, 2024**, considered your application for an after the fact Wetland Conditional Use Permit due to the emergency authorization for repair of the stone wall alongside the North Cemetery. This application is for the restoration and repair of the wall in-kind which includes installation of new stone, installing non-woven geotextile along the eroded bank, importing structural backfill, and loam and seeding the disturbed areas once finished. Said property is shown on Assessor Map 124, Lot 3 and lies within the Municipal (M). As a result of said consideration, the Commission voted to **approve** the Wetland Conditional Use Permit with the following stipulations.

1. Applicant shall monitor the success of reseeded areas to ensure stabilization. If stabilization is not successful within 30 days of seeding, the area will need to be reseeded.

2. Native wetland buffer shrub plantings shall be installed within the temporary accessway area in the Fall of 2024. This should be included in updated plan set for the Planning Board submission.

This matter will be placed on the agenda for the Planning Board meeting scheduled for **Thursday, July 18, 2024**. One (1) hard copy of any revised plans and/or exhibits as well as an updated electronic file (in a PDF format) must be filed in the Planning & Sustainability Department and uploaded to the online permit system no later than Wednesday, June 26, 2024.

The minutes and audio recording of this meeting are available by contacting the Planning & Sustainability Department.

Very truly yours,

Samantha Collins, Chair
Conservation Commission

cc:

Findings of Fact | Home Occupation 2 Conditional Use Permit
City of Portsmouth Planning Board

Date: July 18, 2024
Property Address: 32 Boss Ave.
Application #: LU-24-117
Decision: □ Approve □ Deny □ Approve with Conditions

Findings of Fact:
Per RSA 676:3, I: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of the all conditions necessary to obtain final approval.

Home Occupation 2 Conditional Use Permit
10.242.10 The Planning Board may grant a conditional use permit if the application is found to be in compliance with the general criteria in Section 10.243 or, if applicable, the specific standards or criteria set forth in this Ordinance for the particular use or activity.

	Home Occupation 2 Conditional Use Permit 10.243 Requirements	**Finding** **(Meets Criteria/Requirement)**	**Supporting Information**
1	10.243.21 The design of proposed structures, their height and scale in relation to the site's surroundings, the nature and intensity of the proposed use or activity, and the layout and design of the site will be compatible with adjacent and nearby properties, buildings and uses, will complement or enhance the character of surrounding development, and will encourage the appropriate and orderly development and use of land and buildings in the surrounding area.	**Meets** **Does Not Meet**	The home occupation will be in an existing studio which is contained within the existing dwelling.
2	10.243.22 All necessary public and private utility infrastructure and services will be available and adequate to serve the	**Meets** **Does Not Meet**	The art classes will require minimal water and electricity usage from the existing services that serve the dwelling.

	Home Occupation 2 Conditional Use Permit 10.243 Requirements	Finding (Meets Criteria/Requirement)	Supporting Information
	proposed use.		
3	10.243.23 The site and surrounding streets will have adequate vehicular and pedestrian infrastructure to serve the proposed use consistent with the City's Master Plan.	**Meets** **Does Not Meet**	There are three different routes to access the location in addition to lighted sidewalks. The property has 155 feet of street frontage. The Master Plan supports expanding opportunities for home-based businesses.
4	10.243.24 The proposed structures, uses, or activities will not have significant adverse impacts on abutting and surrounding properties on account of traffic, noise, odors, vibrations, dust, fumes, hours of operation, and exterior lighting and glare.	**Meets** **Does Not Meet**	The classes will be a few hours in length and will not have any significant adverse impact on abutting and surrounding properties on account of traffic, noise, odors, vibrations, dust, fumes, hours of operation and exterior lighting glare.
5	10.243.25 The proposed structures and uses will not have significant adverse impacts on natural or scenic resources surrounding the site, including wetlands, floodplains, and significant wildlife habitat.	**Meets** **Does Not Meet**	The art studio is fully contained within the home and will not impact the wetlands, floodplains or wildlife habitats.
6	10.243.26 The proposed use will not cause or contribute to a significant decline in property values of adjacent properties.	**Meets** **Does Not Meet**	Granting a conditional use permit to allow small art classes will be an asset to the neighborhood and will not cause a decline in property values.
6	**Other Board Findings:**		
7	**Additional Conditions of Approval:**		

June 19, 2024

Rick Chellman, Chair
City of Portsmouth Planning Board
1 Junkins Avenue
Portsmouth, NH 03801

RE: Home Occupation 2 Request for 32 Boss Ave

Dear Mr. Chellman and members of the Planning Board:

I am requesting approval for a **Home Occupation 2 Conditional Use Permit** so I may provide small art classes (up to 6 students) in my home studio. Proposed number of classes will not exceed 1-2 classes per day and each class will generally be ~2-3 hours in length. Anticipated hours for art classes will fall between 8am-5pm M-F (as currently allowed by Home Occupation ordinance). To accommodate working adults/parents, I would like to request flexibility in offering classes in the evenings ~6-9pm 1-2 days a week and one day on the weekend.

Based on current parking spot standards, 3 cars can fit at the base of our driveway in front of our garage, and if needed, 1 in the neck of our driveway (see photos marked Exhibit A).
As part of this conditional use permit, I am requesting 2 additional parking spots on the street (1 is currently allowed by Home Occupation Ordinance) so I can best accommodate seniors and those with mobility challenges*. I have over 155 linear feet of open space on the street directly in front of our home (see property map) which can easily fit 7-8 cars. In addition, I will strongly encourage carpooling whenever possible and install a bike rack next to my studio entrance.

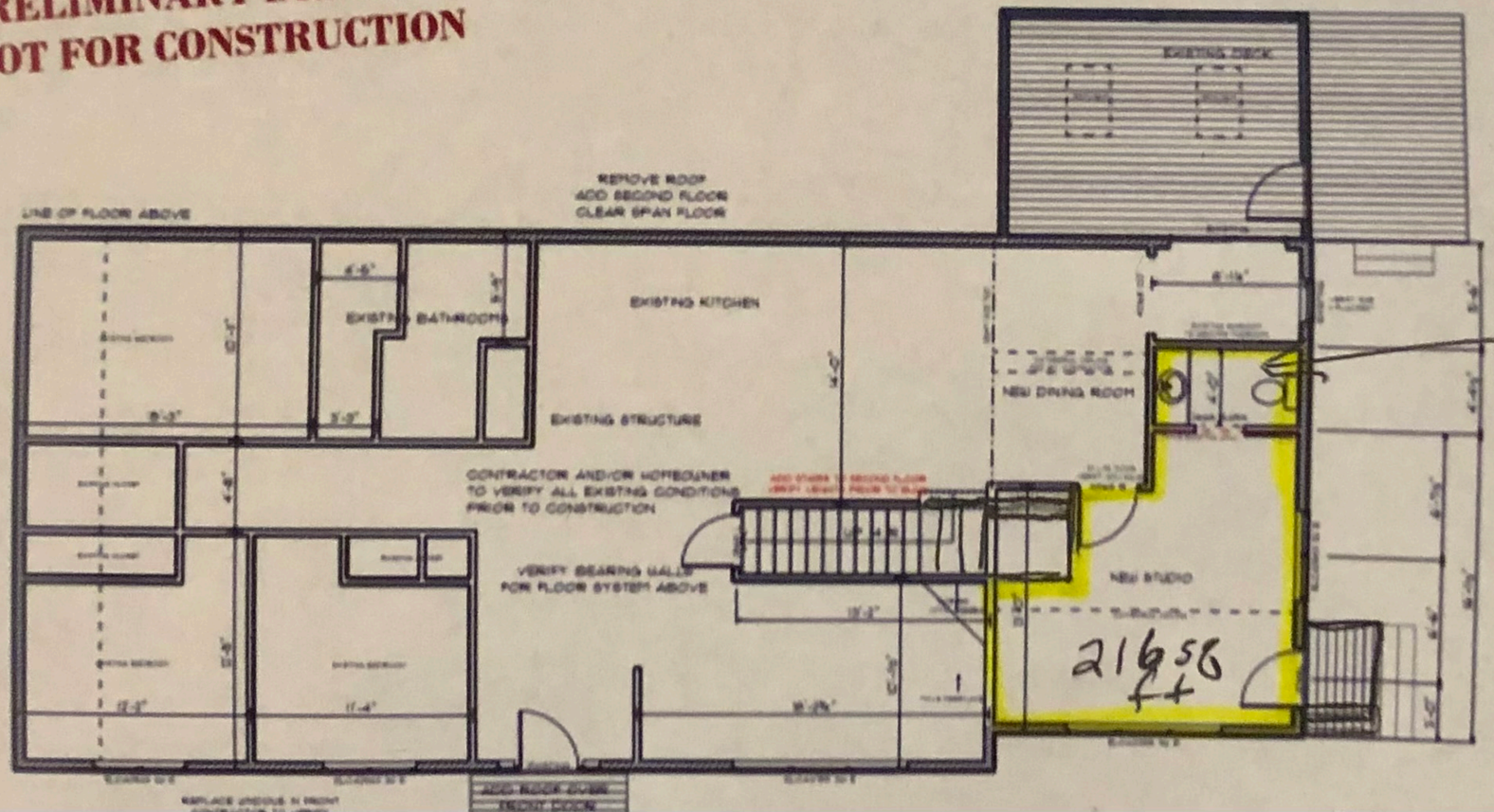
Sincerely,

Karen Rosania
32 Boss Ave
Portsmouth, NH

*Currently, we don't have a walkway extending from street to studio entrance – however, if granted a Conditional Use Permit, we will take necessary steps to have a porous brick walkway installed.

(https://www.google.com/maps/@43.066887,-70.767937,20z?hl=en-US)

PRELIMINARY DRAWING
NOT FOR CONSTRUCTION



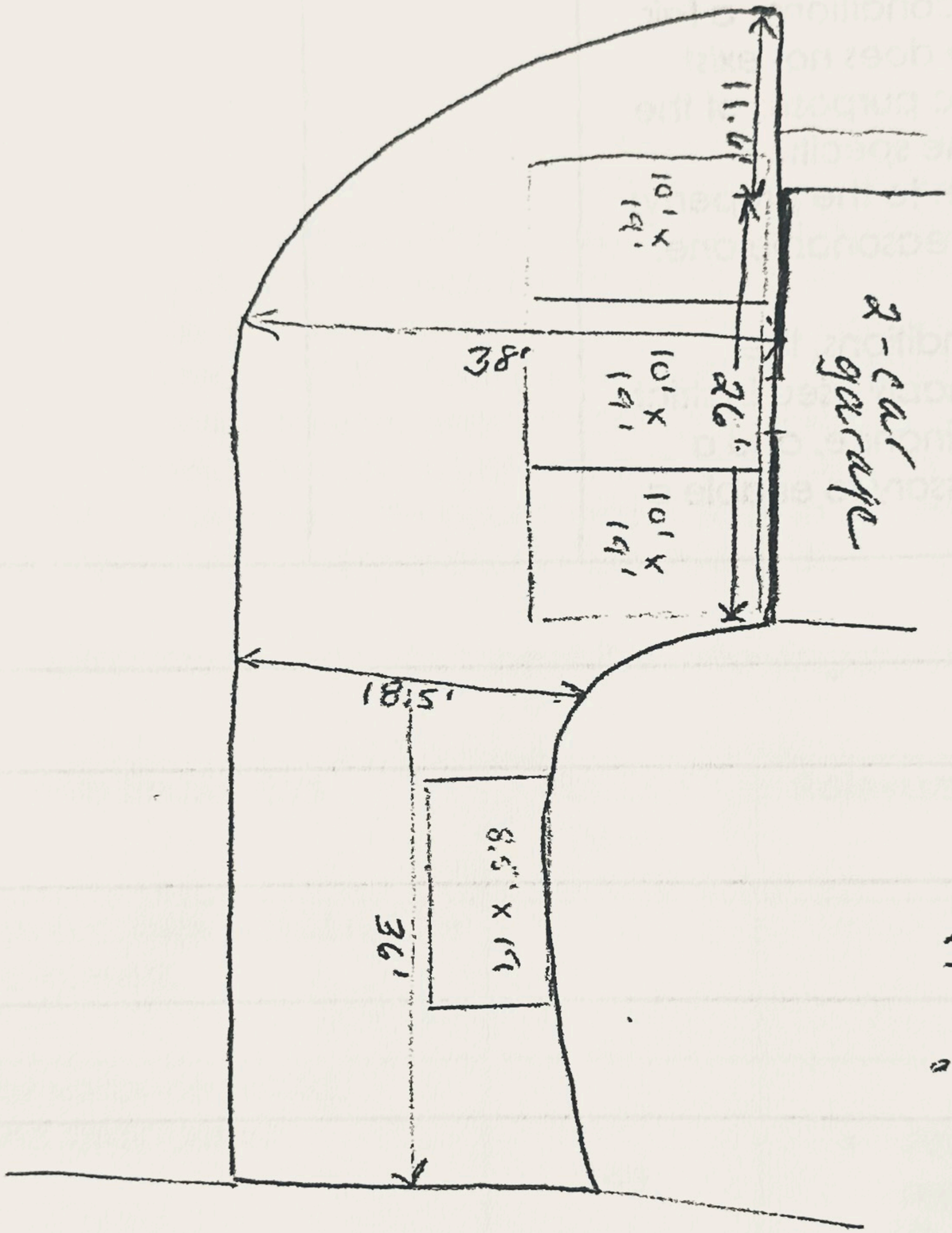
32 sq. ft. bathroom

216
32
248 sq. feet

Studio + studio bathroom


ALL YOU NEED IS LOVE... AND A DOG
BOSS LADY
Olivetea Arts

Exhibit A



32 Boss Ave

▫ = proposed parking
3-4 spots in driveway

Exhibit A

Exhibit A

Sufficient room for another car to pass

Findings of Fact | Detached Accessory Dwelling Unit
City of Portsmouth Planning Board

Date: July 18. 2024
Property Address: 480 Dennett Street
Application #: LU-24-120
Decision: □ Approve □ Deny □ Approve with Conditions

Findings of Fact:
Per RSA 676:3, I: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of the all conditions necessary to obtain final approval.

Zoning Ordinance -10.814.60: Before granting a conditional use permit for a detached ADU, the Planning Board shall make the following findings:

	Section 10.814.62	**Finding** **(Meets Requirement/ Criteria)**	**Supporting Information**
1	10.814.621 The ADU complies with all applicable standards of this Section 10.814 or as may be modified by the conditional use permit.	**Meets** **Does Not Meet**	The DADU complies with the standards in Section 10.814 with no requested modifications.
2	10.814.622 The exterior design of the ADU is architecturally consistent with or similar in appearance to the existing principal dwelling on a lot.	**Meets** **Does Not Meet**	The design of the DADU is compatible with the existing principal dwelling.
3	10.814.623 The site plan provides adequate and appropriate open space and landscaping for both the ADU and the principal dwelling unit and complies with the off-street parking requirements of 10.814.26.	**Meets** **Does Not Meet**	The site plan provides adequate open space and the parking on the lot will exceed the requirement for the DADU.
4	10.814.624 The ADU will maintain a compatible relationship with the character of adjacent and neighborhood properties in terms of location, design, and off-street parking layout, and will not significantly reduce the privacy of adjacent properties.	**Meets** **Does Not Meet**	The new conforming location of the DADU will be compatible with the existing neighborhood and will not reduce the privacy of adjacent properties. The DADU will be located within the existing fenced yard in a conforming location.
5	**Other Board Findings:**		

Planning Department
City of Portsmouth

Re: 480 Dennett St

The property at 480 Dennett St is owned by the applicant and spouse. The house is occupied by the owner and family of three generations.

There is no plan for any change of ownership.

The application is for a detached ADU. The ADU will be occupied by the property owner and spouse. The primary residence will continue to be occupied by the owner's daughter and children.

There will not be a business operated from the residence per city regulations.

The property is currently connected to city water and sewer. No additional connections to city services. All connections for ADU will be provided by the primary residence.

The proposed DADU will be a one bedroom, one bathroom self contained standalone structure with separate access. All zoning requirements for lot coverage and lot line setbacks will be satisfied for an accessory structure.

There will be 4 off road parking spaces provided. There is also city planned on street parking directly in front of the residence.

Left side of backyard.

Left side of front yard.

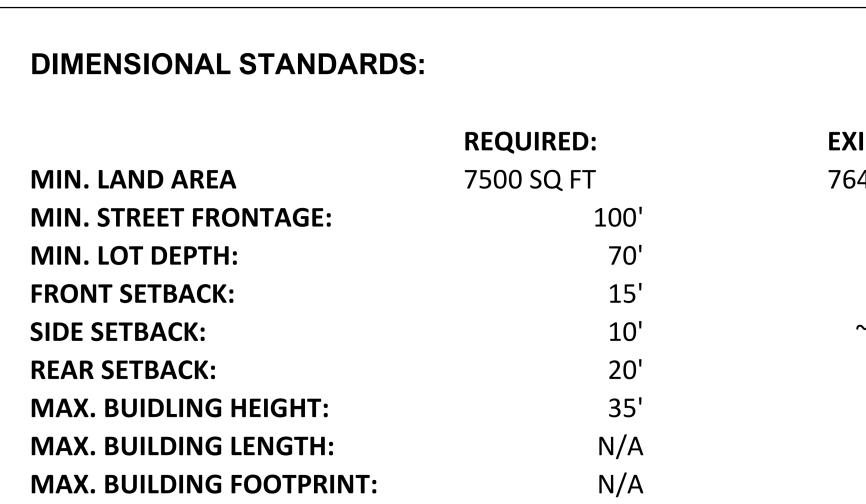
Backyard from deck.

Right side of front yard.

DIMENSIONAL STANDARDS:

	REQUIRED:	EXISTING:	PROPOSED:
MIN. LAND AREA	7500 SQ FT	7648 SQ FT	7648 SQ FT
MIN. STREET FRONTAGE:	100'	64'	64'
MIN. LOT DEPTH:	70'	120'	120'
FRONT SETBACK:	15'	15'	15'
SIDE SETBACK:	10'	~8' (EXISTING HOUSE)	10' (ADU)
REAR SETBACK:	20'	24'	11'-4"
MAX. BUIDLING HEIGHT:	35'	15'	15'
MAX. BUILDING LENGTH:	N/A		
MAX. BUILDING FOOTPRINT:	N/A		
MAX. BUILDING COVEREAGE:	25%	18.40%	24.86%
LOT AREA/DWELLING UNIT	7500 SQ FT	7648 SQ FT	7648 SQ FT
MIN OPEN SPACE:	N/A		

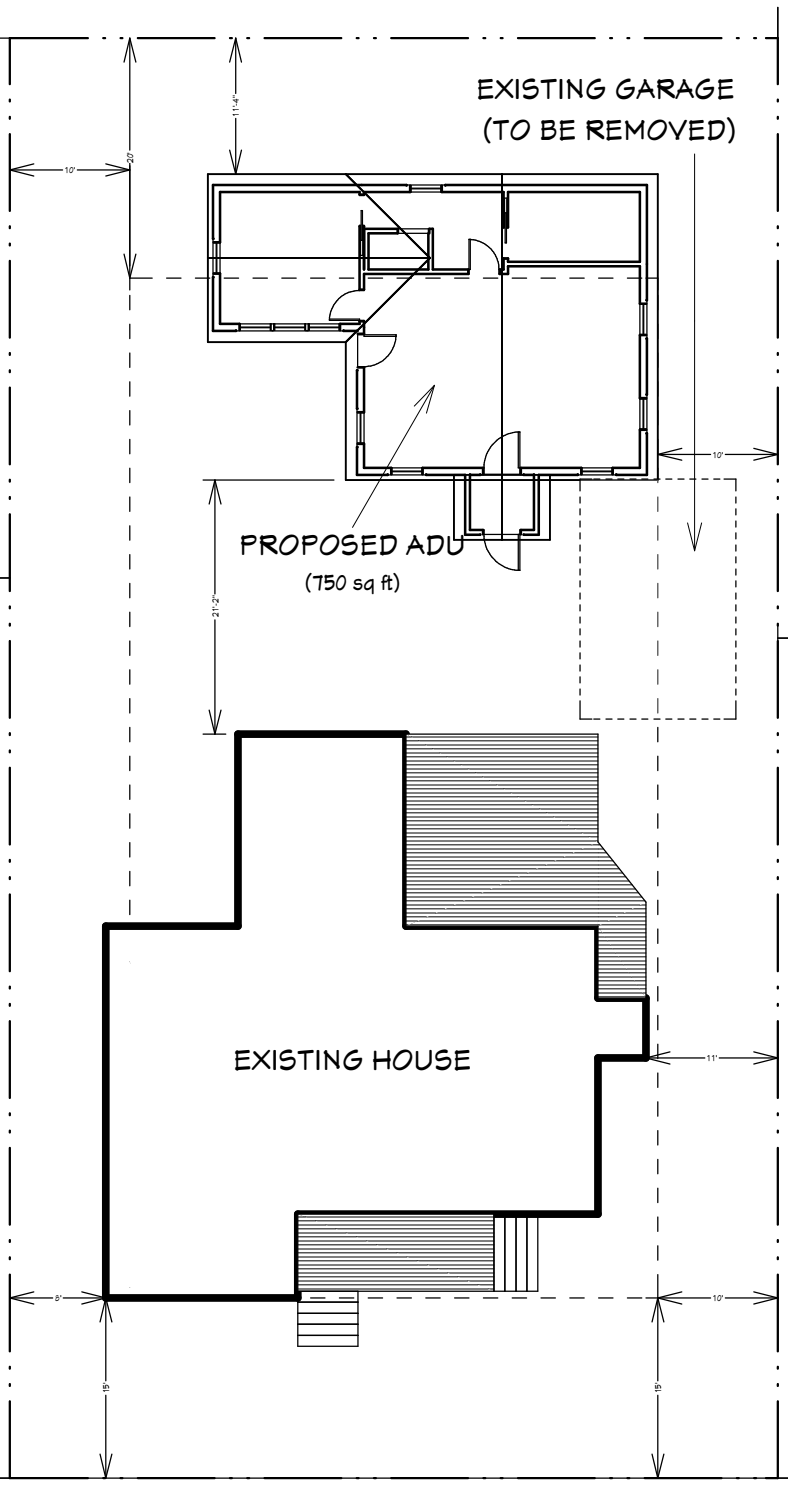
Address: 480 Dennett St. Portsmouth, NH
Zone: GRA
Proposal: D-ADU
Proposal area: 750 sq. ft.
Bedrooms: 1
Bathrooms: 1



Abutting Lot
172 Thornton St.
~.2 ac
PID: 34965
Mblu: 160-20

Abutting Lot
190 Thornton St.
~.21 ac
PID: 34991
Mblu: 161-05

Abutting Lot
24 Burkitt St.
~.09 ac
PID: 34968
Mblu: 160-23



Abutting Lot
17 Stark St.
~.18 ac
PID: 834989
Mblu: 161-03

Abutting Lot
466 Dennett St.
~.07 ac
PID: 34970
Mblu: 160-25

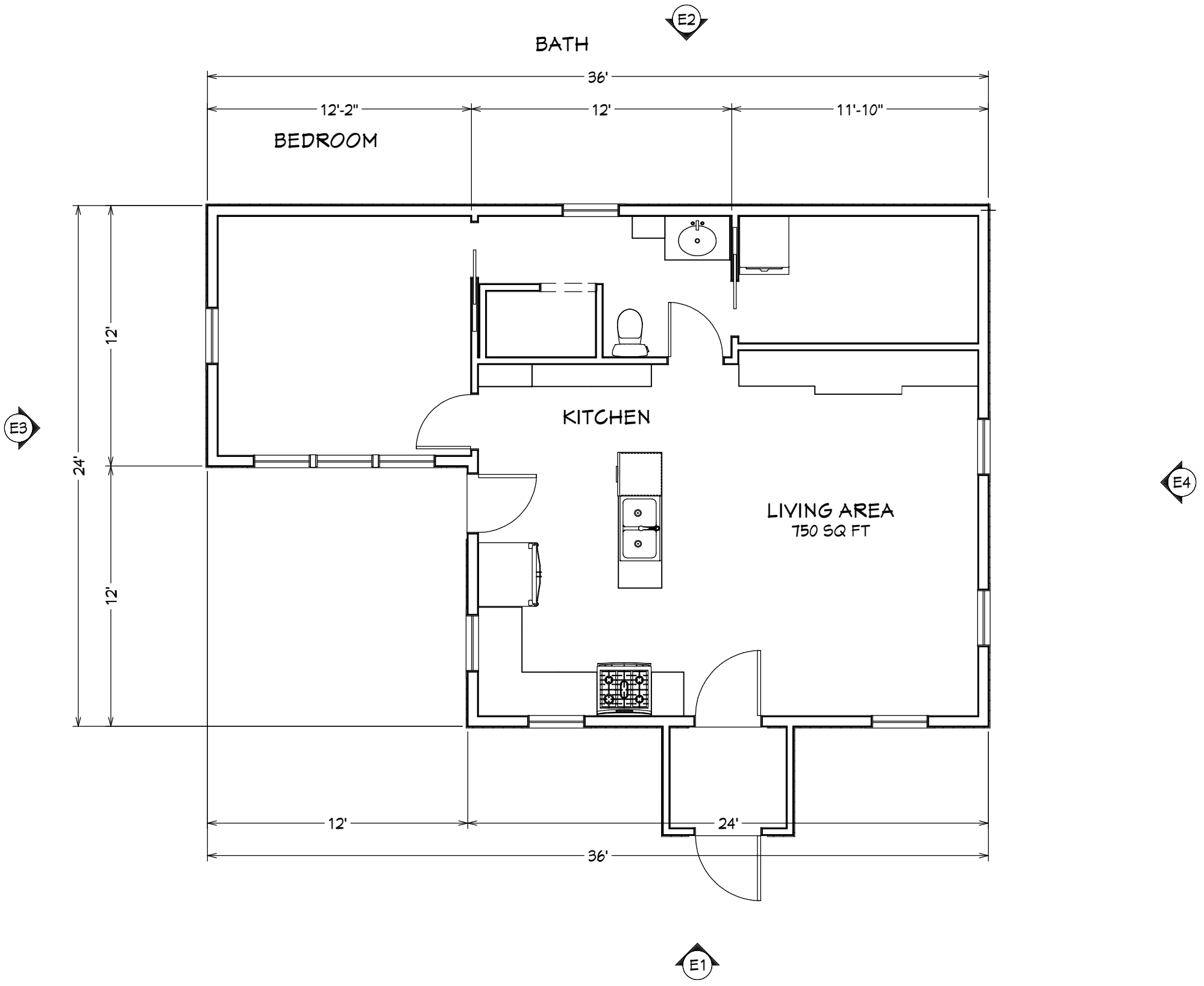
Abutting Lot
500 Dennett St.
~.12 ac
PID: 34987
Mblu: 161-01

DENNETT ST

SHEET:	SCALE:	DATE:	DRAWINGS PROVIDED BY:		
P-1	1" : 12'	6/23/2024	Wild Eden Design ryan@wildedendesign.com 603.502.9475	GREENWOOD RESIDENCE 480 DENNETT ST. PORSTMOUTH, NH 03801	SITE PLAN

REVISION TABLE			
NUMBER	DATE	REVISED BY	DESCRIPTION

FLOOR PLAN 3/16" : 1'



SHEET:	SCALE:	DATE:
	1" : 12'	6/23/2024

DRAWINGS PROVIDED BY:
Wild Eden Design
ryan@wildedendesign.com
603.502.9475

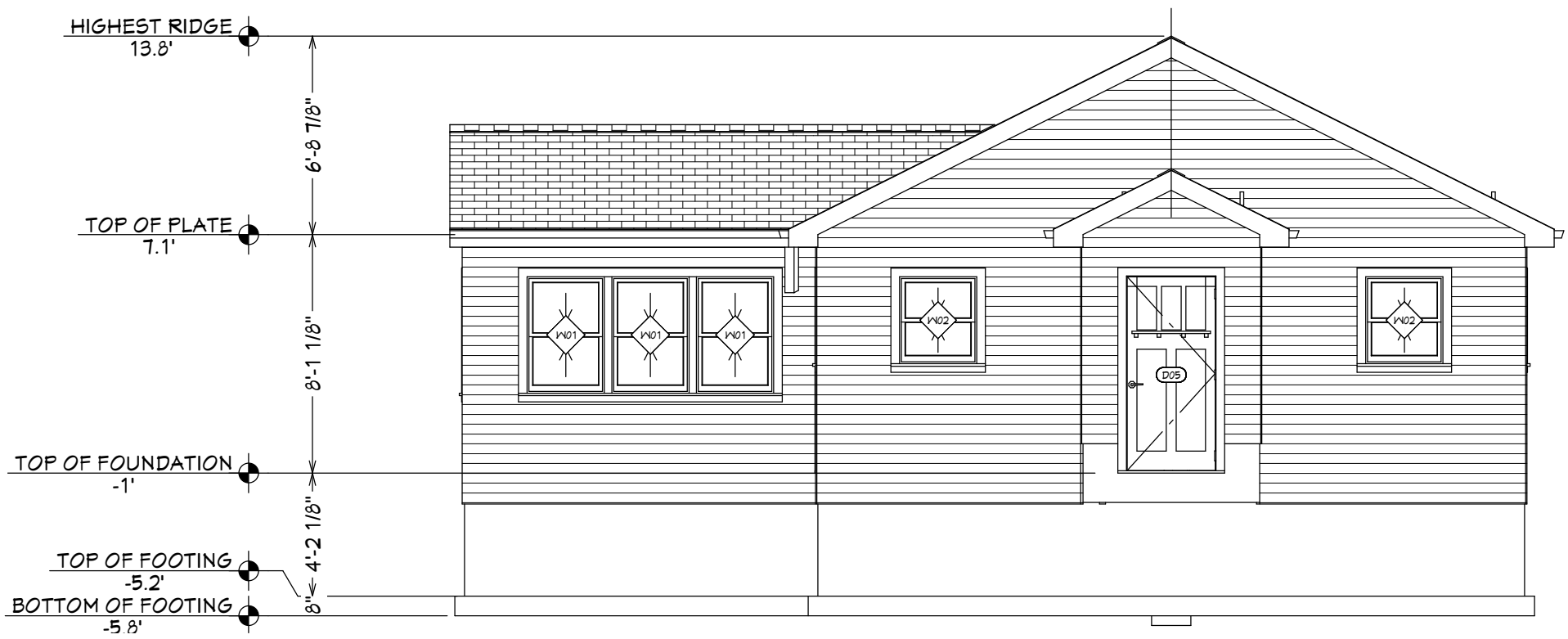
GREENWOOD RESIDENCE
480 DENNETT ST.
PORSTMOUTH, NH 03801

FLOOR PLAN

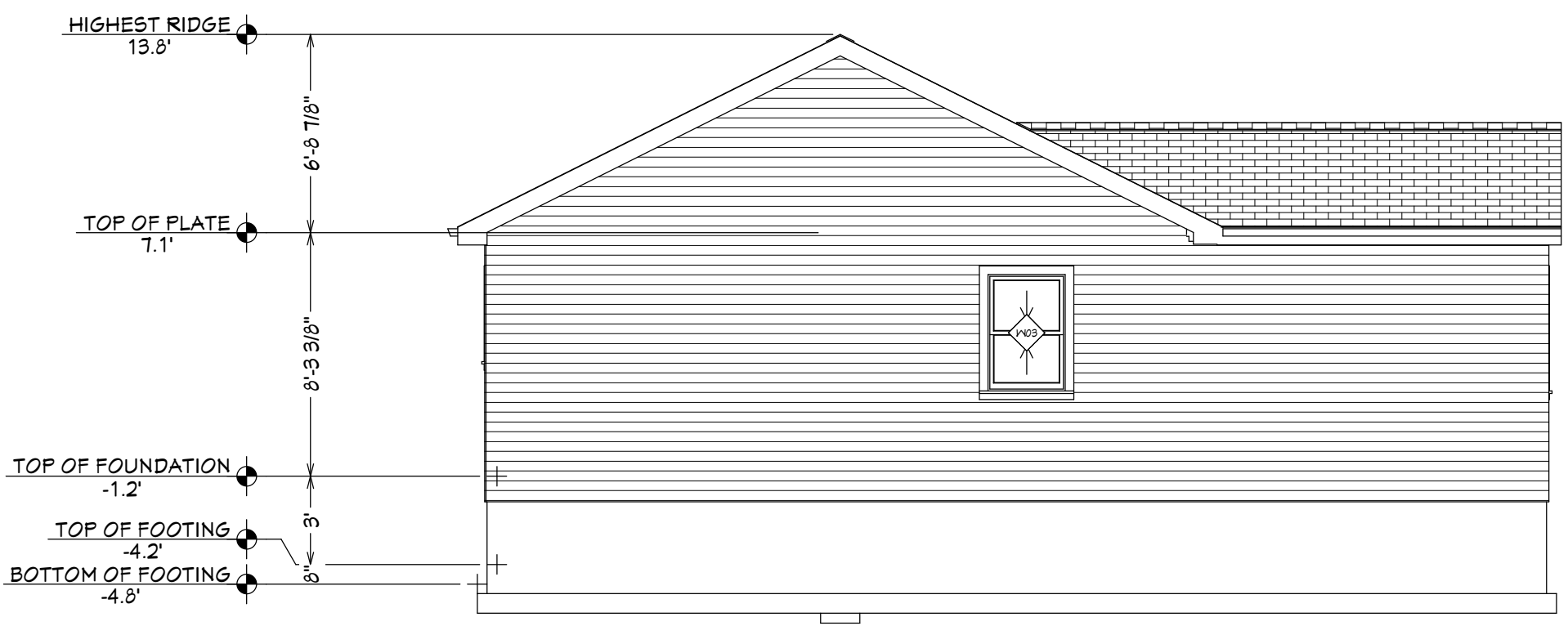
REVISION TABLE

NUMBER	DATE	REVISED BY	DESCRIPTION

ELEVATION 1 3/16" : 1'



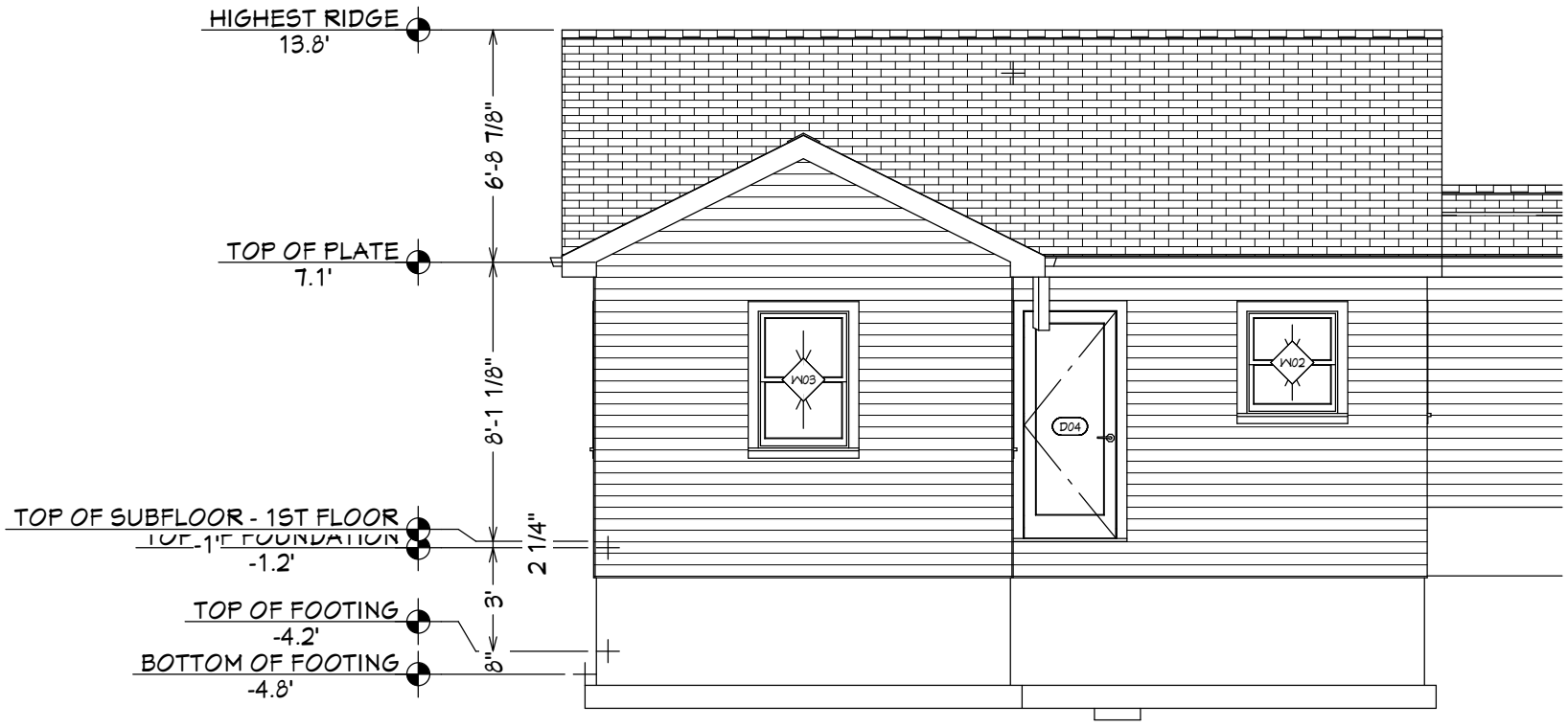
ELEVATION 2 3/16" : 1'



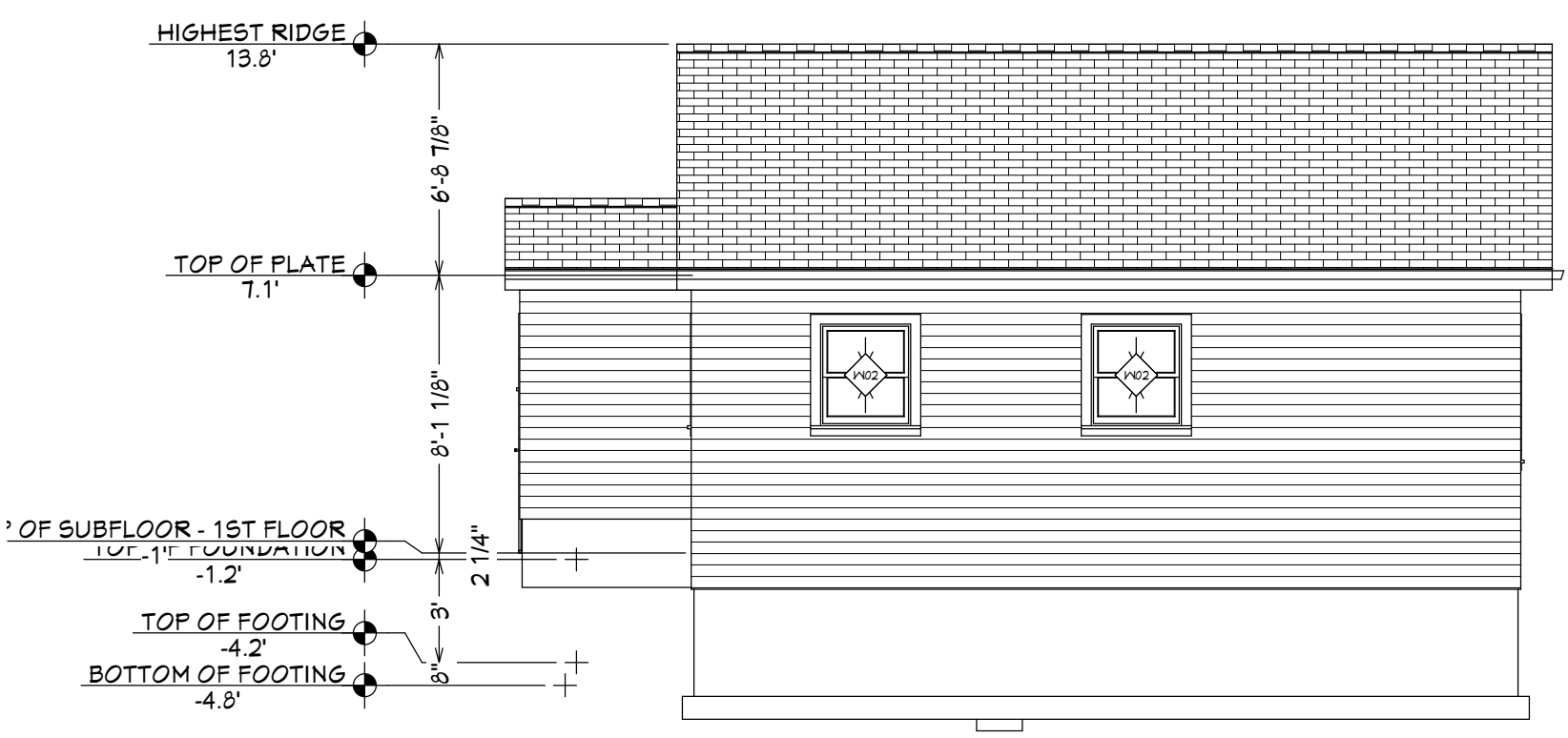
SHEET:	SCALE:	DATE:	DRAWINGS PROVIDED BY:		
	1" : 12'	6/23/2024	Wild Eden Design ryan@wildedendesign.com 603.502.9475	GREENWOOD RESIDENCE 480 DENNETT ST. PORSTMOUTH, NH 03801	ELEVATIONS

REVISION TABLE			
NUMBER	DATE	REVISED BY	DESCRIPTION

ELEVATION 3 3/16" : 1'



ELEVATION 4 3/16" : 1'



SHEET:	SCALE:	DATE:
	1" : 12'	6/23/2024

DRAWINGS PROVIDED BY:
Wild Eden Design
ryan@wildedendesign.com
603.502.9475

GREENWOOD RESIDENCE
480 DENNETT ST.
PORSTMOUTH, NH 03801

ELEVATIONS

REVISION TABLE

NUMBER	DATE	REVISED BY	DESCRIPTION

Findings of Fact | Outdoor Dining Conditional Use Permit
City of Portsmouth Planning Board

Date: July 18, 2024
Property Address: 125 Brewery Lane
Application #: LU-24-108
Decision: □ Approve □ Deny □ Approve with Conditions

Findings of Fact:
Per RSA 676:3, I: The local land use board shall issue a final written decision which either approves or disapproves an application for a local permit and make a copy of the decision available to the applicant. **The decision shall include specific written findings of fact that support the decision. Failure of the board to make specific written findings of fact supporting a disapproval shall be grounds for automatic reversal and remand by the superior court upon appeal, in accordance with the time periods set forth in RSA 677:5 or RSA 677:15, unless the court determines that there are other factors warranting the disapproval.** If the application is not approved, the board shall provide the applicant with written reasons for the disapproval. If the application is approved with conditions, the board shall include in the written decision a detailed description of the all conditions necessary to obtain final approval.

Outdoor Dining Conditional Use Permit
10.242.10 The Planning Board may grant a conditional use permit if the application is found to be in compliance with the general criteria in Section 10.243 or, if applicable, the specific standards or criteria set forth in this Ordinance for the particular use or activity.

	Outdoor Dining Conditional Use Permit 10.243 Requirements	**Finding** (Meets Criteria/Requirement)	**Supporting Information**
1	10.243.21 The design of proposed structures, their height and scale in relation to the site's surroundings, the nature and intensity of the proposed use or activity, and the layout and design of the site will be compatible with adjacent and nearby properties, buildings and uses, will complement or enhance the character of surrounding development, and will encourage the appropriate and orderly development and use of land and buildings in the surrounding area.	**Meets** **Does Not Meet**	The proposed patio, located behind the building at 125 Brewery Lane, will consist of an approximately 470 square foot gravel patio. Seating will consist of picnic tables and bistro tables and seating. One table will be adjacent to the concrete space to allow for handicap access. Seating will consist of approximately 1-2 picnic tables and 1-3 bistro tables and chairs and/or an assortment of lawn chairs.
2	10.243.22 All necessary public and private utility infrastructure and services will be available and adequate to serve the	**Meets** **Does Not Meet**	No alteration to public and/or private utility infrastructure is required as part of the proposed use.

	Outdoor Dining Conditional Use Permit 10.243 Requirements	Finding (Meets Criteria/Requirement)	Supporting Information
	proposed use.		
3	10.243.23 The site and surrounding streets will have adequate vehicular and pedestrian infrastructure to serve the proposed use consistent with the City's Master Plan.	**Meets** **Does Not Meet**	There will be no impact to vehicular or pedestrian infrastructure as part of the proposed use of the space.
4	10.243.24 The proposed structures, uses, or activities will not have significant adverse impacts on abutting and surrounding properties on account of traffic, noise, odors, vibrations, dust, fumes, hours of operation, and exterior lighting and glare.	**Meets** **Does Not Meet**	Sufficient parking is available at the business address. Additional parking is located in nearby lots during business hours. No outdoor speakers or live music will be offered on the patio. Hours of operation are between 10am - 8pm.
5	10.243.25 The proposed structures and uses will not have significant adverse impacts on natural or scenic resources surrounding the site, including wetlands, floodplains, and significant wildlife habitat.	**Meets** **Does Not Meet**	No wetlands, floodplains, wildlife habitats, or other natural or scenic resources are present at the site of the proposed patio.
6	10.243.26 The proposed use will not cause or contribute to a significant decline in property values of adjacent properties.	**Meets** **Does Not Meet**	The proposed patio will not cause or contribute to a significant decline in property value of the adjacent properties.
6	**<u>Other Board Findings:</u>**		
7	**<u>Additional Conditions of Approval</u>:**		

Conditional Use Permit Narrative

For

TREELINE OUTFITTERS

125 Brewery Lane

* 10.243.21 The design of proposed structures, their height and scale in relation to the site's surroundings, the nature and intensity of the proposed use or activity, and the layout and design of the site will be compatible with adjacent and nearby properties, buildings and uses, will complement or enhance the character of surrounding development, and will encourage the appropriate and orderly development and use of land and buildings in the surrounding area.

The proposed patio, located behind the building at 125 Brewery Lane, will consist of an approximately 470 square foot gravel patio. Seating will consist of picnic tables and bistro tables and seating. One table will be adjacent to the concrete space to allow for handicap access. Seating will consist of approximately 1-2 picnic tables and 1-3 bistro tables and chairs and/or an assortment of lawn chairs.

* 10.243.22 All necessary public and private utility infrastructure and services will be available and adequate to serve the proposed use.

No alteration to public and/or private utility infrastructure is required as part of the proposed use.

* 10.243.23 The site and surrounding streets will have adequate vehicular and pedestrian infrastructure to serve the proposed use consistent with the City's Master Plan.

There will be no impact to vehicular or pedestrian infrastructure as part of the proposed use of the space.

* 10.243.24 The proposed structures, uses, or activities will not have significant adverse impacts on abutting and surrounding properties on account of traffic, noise, odors, vibrations, dust, fumes, hours of operation, and exterior lighting and glare.

Sufficient parking is available at the business address. Additional parking is located in nearby lots during business hours. No outdoor speakers or live music will be offered on the patio. Hours of operation are between 10am - 8pm.

* 10.243.25 The proposed structures and uses will not have significant adverse impacts on natural or scenic resources surrounding the site, including wetlands, floodplains, and significant wildlife habitat.

No wetlands, floodplains, wildlife habitats, or other natural or scenic resources are present at the site of the proposed patio.

* 10.243.26 The proposed use will not cause or contribute to a significant decline in property values of adjacent properties.

The proposed patio will not cause or contribute to a significant decline in property value of the adjacent properties.

Photo Log

Photo 1: Existing gravel patio with concrete walkway and landscaped areas.

Photo 2: Existing gravel patio and landscaped area. The proposed plan includes a) removing the arborvitae (center of the photo) and overgrown weeds; b) laying gravel over the area with grass and overgrown weeds; and c) leaving the mulched area, lilies, and maple tree.

Photo 3: Rear of the building at 125 Brewery Lane with existing gravel patio, landscaped area, and overgrown weeds. The proposed plan includes removing the arborvitae (left) and overgrown weeds (right) and laying gravel over the area with grass and overgrown weeds. The granite curb demarcating the current grass and gravel patio will be removed.

ALTUS ENGINEERING

Civil
Site Planning
Environmental
Engineering

133 Court Street
Portsmouth, NH
03801-4413

July 8, 2024

Rick Chellman, Chairman
City of Portsmouth Planning Board
City of Portsmouth Municipal Complex
1 Junkins Avenue
Portsmouth, New Hampshire 03801

Re: Application for Preliminary/Conceptual Review
Assessor's Map 222, Lot 11
550 Sagamore Avenue
Altus Project No. 5591

Dear Mr. Chellman,

On behalf of Green and Company (Green), Altus Engineering, LLC (Altus) is pleased to submit an application for the Planning Board Conceptual/Preliminary Review. Green has an agreement to purchase the property located at 550 Sagamore Avenue from The Frances E. Mouflouze Revocable Trust of 2015. They are proposing to construct a new subdivision roadway to access three new residential house lots.

Enclosed is the Existing Conditions Survey Plan and the Conceptual Subdivision Plan for discussion at the July 19, 2024 Planning Board meeting.

There is a single residence on the 1.44-acre parcel. The parcel lies within the Single Resident B Zoning District which has a minimum 15,000 SF lot size requirement. By area, the parcel can support 4-homes. Multiple dwelling units on a lot is not permitted in the zone. The current Owner applied for variances on two occasions to allow 4 then 3 dwelling units on the parcel without subdivision with the concept to preserve and protect the majority of the forested area. The Board of Adjustment denied the variances in both scenarios leaving the only viable alternative to develop the parcel as a conventional subdivision.

The majority of the parcel is forested with some ledge outcrops. There is a small wetland system along the northerly boundary that is not a vernal pool and does not require any buffer protection. Enclosed is documentation from Joseph Noel, Wetlands Scientist, confirming the wetland status.

We are proposing to construct a private 40-foot wide with a 20-foot-wide paved surface roadway to access the lots. All of the lots will be accessed from the new private street. A homeowner's

association will maintain the roadway and stormwater management system. The lots will be serviced with municipal water and sewer.

On June 11th, we presented the proposal to the Technical Advisory Committee to obtain their feedback and input. They gave us guidance on the technical aspects of the design should we decide to proceed with permitting.

We look forward to getting input from the Board. Please feel free to call or email me directly should you have any questions or need any additional information in advance of the meeting.

Sincerely,

ALTUS ENGINEERING, LLC

Enclosures

eCopy: Michael Green
Jenna Green

wde/5591.00 7-8-24 cvr ltr.docx

Letter of Authorization

I/We, Ted W Alex and Patricia Cameron trustees of The Frances E Mouflouze Revocable Trust of 2015 u/d/t dated September 24, 2015, as owner of certain real property situated in Portsmouth, NH further described 1.48 +/- acres of land with single family home located at 550 Sagamore Avenue with 140' of frontage on Sagamore Avenue, as shown in Tax Assessors Map 222 Lot 11 and further defined by legal description found at the Rockingham County Registry of Deeds Book 5660 Page 2227 dated October 7th, 2015. (hereinafter, "Property") do hereby authorize Green & Company Building and Development Corp. and its Affiliates, Agents, Assigns and Engineers to act on my/our behalf and to appear before the zoning board of adjustment and/or the planning board of said city/town and/or any of its boards or commissions, in my/our behalf for the purpose of seeking any regulatory relief that may be requested by the person I/we have above authorized, including variances, special exceptions, dimensional waivers, site plan approval, lot line adjustment approval and subdivision approval, hereby ratifying any actions taken by him/her/them to obtain any such relief. I/We authorize Green & Company Building and Development Corp. and its Affiliates, Agents, Assigns and Engineers to act in my/our behalf in all matters concerning the development and approval process, without limitation, for the above stated property, to include any required signatures.

I/We shall cooperate fully with Green & Company Building and Development Corp. and its Affiliates, Agents, Assigns and Engineers in seeking timely public approvals and for the completion of the sale contemplated herein. I/We agree to use my/our good faith efforts to provide any assistance I/we reasonably can to Green & Company Building and Development Corp. and its Affiliates, Agents, Assigns and Engineers throughout the development process, including but not limited to signing permit applications as needed.

DocuSigned by:
Sharon L. Hartford
3045470F2FB1400...
Witness

DocuSigned by:
C9BBD450C97142D...
Owner:

5/29/2024
Date

DocuSigned by:
Sharon L. Hartford
3045470F2FB1400...
Witness

DocuSigned by:
523068DE631B416...
Owner:

5/29/2024
Date

JOSEPH W. NOEL
P.O. BOX 174
SOUTH BERWICK, MAINE 03908
(207) 384-5587

*CERTIFIED SOIL SCIENTIST * WETLAND SCIENTIST * LICENSED SITE EVALUATOR*

June 15, 2024

Mr. Eric D. Weinrieb, P.E.
Altus Engineering
133 Court Street
Portsmouth, New Hampshire 03801

RE: Wetland Delineation, 550 Sagamore Avenue, Portsmouth, New Hampshire, JWN #24-58

Dear Eric:

On May 10, 2024, an on-site was made to the above-referenced property (per your request). The purpose was to determine if there were any areas on the lot that would classify as a wetland. A residential home is situated near Sagamore Avenue with the eastern side of the lot being wooded with sporadic bedrock outcrops. One small isolated basin, centrally located on the northern property line did qualify as a wetland. Six sequentially numbered pink and black striped flags (labelled EOW1 thru EOW6) were placed along the wetland-upland boundary.

To determine the wetland boundary, the methodologies in the U.S. Army Corps of Engineers document *Corps of Engineers Wetlands Delineation Manual* (1987) along with the required *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*, (Version 2.0) were used. Wetlands were identified based on soils, vegetation, and hydrology. Except in special cases, all three factors (hydric soils, hydrophytic vegetation, and wetland hydrology) must be present for an area to classify as wetland.

The wetland area was not ponded with surface water on the day of the site visit. There was evidence of occasional surface water (i.e., water marks) along with blackened leaves and orientated pine needles on the soil surface. The lack of surface water eliminated this area, in my opinion, from being a potential vernal pool. There appears to be a limited watershed that contributes run-off to this basin. Also, there is some evidence that the abutting lot has added fill material that may have blocked the natural runoff from this basin to downslope areas. To be a viable vernal pool surface water needs to be present in the early spring and the hydroperiod needs to be long enough for the breeding amphibians to complete the early life cycle to a juvenile age. This spring there were a number of rain events that filled most vernal pools and this basin did not contain water on May 10, 2024.

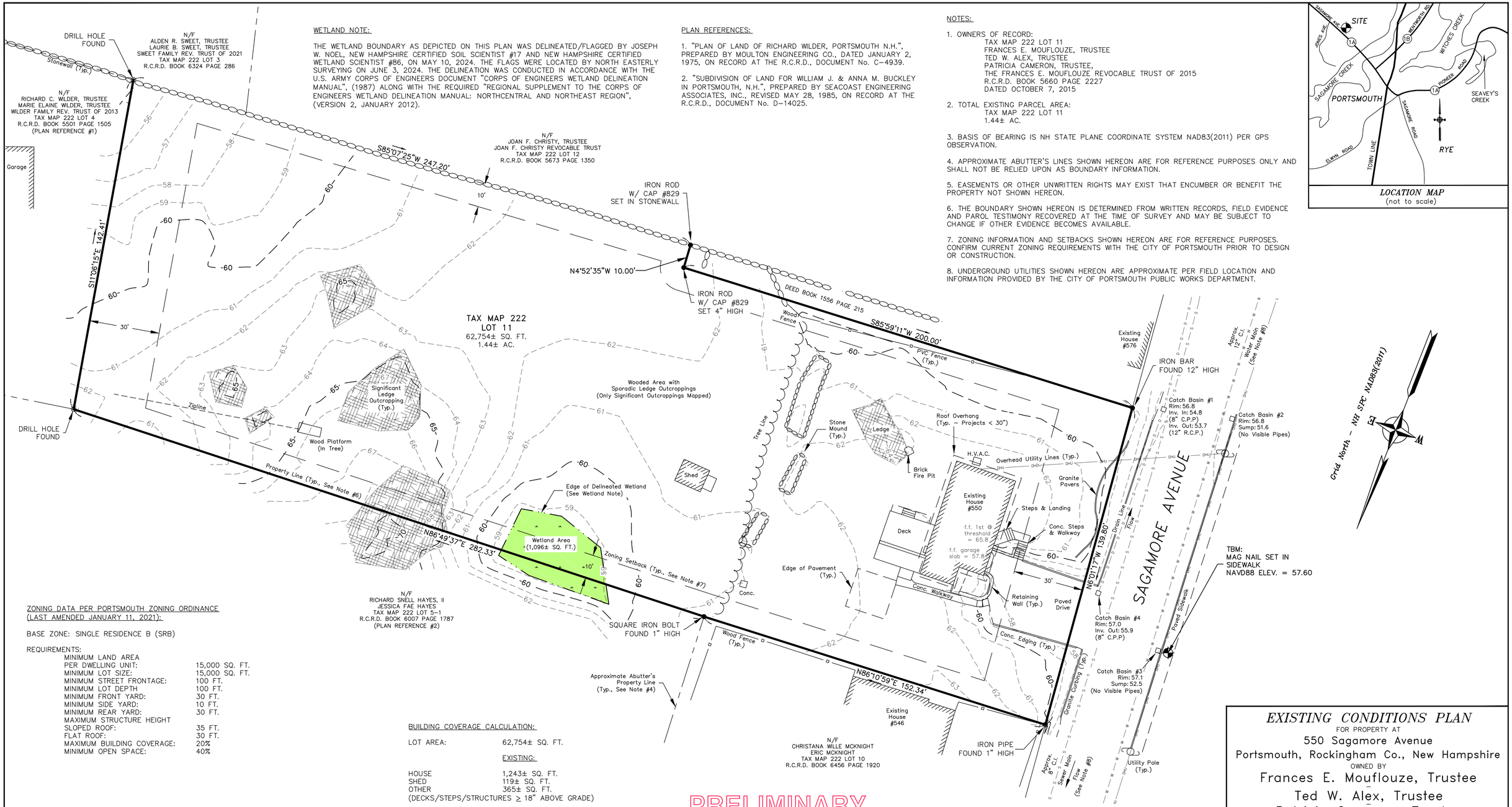
This basin does classify as a wetland based on: the poorly drained soil conditions (i.e., hydric soils), evidence of soil saturation and occasional ponding (evidence of wetland hydrology), and

while vegetation was limited in the basin, a few red maples (*Acer* rubrum) were observed (i.e., hydrophytic vegetation).

I hope this letter is sufficient for your planning purposes. Please do not hesitate to call with any questions or concerns.

Sincerely,

Joseph W. Noel
NH Certified Soil Scientist #017
NH Certified Wetland Scientist #086



LOCATION MAP
(not to scale)

WETLAND NOTE:

THE WETLAND BOUNDARY AS DEPICTED ON THIS PLAN WAS DELINEATED/FLAGGED BY JOSEPH W. NOEL, NEW HAMPSHIRE CERTIFIED SOIL SCIENTIST #17 AND NEW HAMPSHIRE CERTIFIED WETLAND SCIENTIST #86, ON MAY 10, 2024. THE FLAGS WERE LOCATED BY NORTH EASTERLY SURVEYING ON JUNE 3, 2024. THE DELINEATION WAS CONDUCTED IN ACCORDANCE WITH THE U.S. ARMY CORPS OF ENGINEERS DOCUMENT "CORPS OF ENGINEERS WETLAND DELINEATION MANUAL", (1987) ALONG WITH THE REQUIRED "REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION", (VERSION 2, JANUARY 2012).

PLAN REFERENCES:

1. "PLAN OF LAND OF RICHARD WILDER, PORTSMOUTH N.H.", PREPARED BY MOULTON ENGINEERING CO., DATED JANUARY 2, 1975, ON RECORD AT THE R.C.R.D., DOCUMENT No. C-4939.

2. "SUBDIVISION OF LAND FOR WILLIAM J. & ANNA M. BUCKLEY IN PORTSMOUTH, N.H.", PREPARED BY SEACOAST ENGINEERING ASSOCIATES, INC., REVISED MAY 28, 1985, ON RECORD AT THE R.C.R.D., DOCUMENT No. D-14025.

NOTES:

1. OWNERS OF RECORD:
TAX MAP 222 LOT 11
FRANCES E. MOUFLOUZE, TRUSTEE
TED W. ALEX, TRUSTEE
PATRICIA CAMERON, TRUSTEE,
THE FRANCES E. MOUFLOUZE REVOCABLE TRUST OF 2015
R.C.R.D. BOOK 5660 PAGE 2227
DATED OCTOBER 7, 2015

2. TOTAL EXISTING PARCEL AREA:
TAX MAP 222 LOT 11
1.44± AC.

3. BASIS OF BEARING IS NH STATE PLANE COORDINATE SYSTEM NAD83(2011) PER GPS OBSERVATION.

4. APPROXIMATE ABUTTER'S LINES SHOWN HEREON ARE FOR REFERENCE PURPOSES ONLY AND SHALL NOT BE RELIED UPON AS BOUNDARY INFORMATION.

5. EASEMENTS OR OTHER UNWRITTEN RIGHTS MAY EXIST THAT ENCUMBER OR BENEFIT THE PROPERTY NOT SHOWN HEREON.

6. THE BOUNDARY SHOWN HEREON IS DETERMINED FROM WRITTEN RECORDS, FIELD EVIDENCE AND PAROL TESTIMONY RECOVERED AT THE TIME OF SURVEY AND MAY BE SUBJECT TO CHANGE IF OTHER EVIDENCE BECOMES AVAILABLE.

7. ZONING INFORMATION AND SETBACKS SHOWN HEREON ARE FOR REFERENCE PURPOSES. CONFIRM CURRENT ZONING REQUIREMENTS WITH THE CITY OF PORTSMOUTH PRIOR TO DESIGN OR CONSTRUCTION.

8. UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE PER FIELD LOCATION AND INFORMATION PROVIDED BY THE CITY OF PORTSMOUTH PUBLIC WORKS DEPARTMENT.

ZONING DATA PER PORTSMOUTH ZONING ORDINANCE
(LAST AMENDED JANUARY 11, 2021):

BASE ZONE: SINGLE RESIDENCE B (SRB)

REQUIREMENTS:

MINIMUM LAND AREA PER DWELLING UNIT:	15,000 SQ. FT.
MINIMUM LOT SIZE:	15,000 SQ. FT.
MINIMUM STREET FRONTAGE:	100 FT.
MINIMUM LOT DEPTH	100 FT.
MINIMUM FRONT YARD:	30 FT.
MINIMUM SIDE YARD:	10 FT.
MINIMUM REAR YARD:	30 FT.
MAXIMUM STRUCTURE HEIGHT	
SLOPED ROOF:	35 FT.
FLAT ROOF:	30 FT.
MAXIMUM BUILDING COVERAGE:	20%
MINIMUM OPEN SPACE:	40%

OPEN SPACE CALCULATION:

LOT AREA:	62,754± SQ. FT.
EXISTING COVERAGE:	
HOUSE	1,243± SQ. FT.
SHED	119± SQ. FT.
PAVEMENT	1,440± SQ. FT.
WALKWAYS/RET. WALLS	201± SQ. FT.
DECKS/STEPS/LANDINGS	606± SQ. FT.
UTILITIES/OTHER	20± SQ. FT.
TOTAL COVERAGE:	3,629± SQ. FT.
EXISTING OPEN SPACE:	59,125± SQ. FT. (94.2%)

BUILDING COVERAGE CALCULATION:

LOT AREA:	62,754± SQ. FT.
EXISTING:	
HOUSE	1,243± SQ. FT.
SHED	119± SQ. FT.
OTHER	365± SQ. FT.
(DECKS/STEPS/STRUCTURES ≥ 18" ABOVE GRADE)	
TOTAL:	1,727± SQ. FT. (2.8%)

BUILDING HEIGHT CALCULATION:

EXISTING PEAK ELEVATION: 78.1
EXISTING EAVE ELEVATION: 73.0
AVG. PEAK/EAVE = 75.6

EXISTING GRADE PLANE (AVG. GRADE): 62.5

EXISTING BUILDING HEIGHT = 13.1'

PRELIMINARY
NOT FOR PERMITTING
NOT FOR CONVEYANCE

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.
VERTICAL DATUM IS NAVD88
CONTOUR INTERVAL = 1'

PURPOSE OF PLAN:

THE PURPOSE OF THIS PLAN IS TO SHOW EXISTING CONDITIONS FOR DESIGN PURPOSES. THIS PLAN IS NOT A STANDARD BOUNDARY SURVEY AND IS NOT INTENDED TO BE RECORDED, USED FOR CONVEYANCE, OR ANY OTHER TITLE PURPOSE.

REV.	DATE	STATUS	BY	CHKD	APPD.
A	6/3/24	ADD WETLAND & WETLAND NOTE	A.P.M.	P.L.A.	P.L.A.

EXISTING CONDITIONS PLAN

FOR PROPERTY AT
550 Sagamore Avenue
Portsmouth, Rockingham Co., New Hampshire
OWNED BY
Frances E. Mouflouze, Trustee
Ted W. Alex, Trustee
Patricia Cameron, Trustee
The Frances E. Mouflouze Revocable Trust of 2015
c/o Ted W. Alex
104 Locke Road, Rye, NH 03870

North
EASTERLY
SURVEYING, Inc.
SURVEYORS IN N.H. & MAINE
(207) 439-6333
191 STATE ROAD, SUITE #1
KITTERY, MAINE 03904

SCALE:	PROJECT NO.	DATE:	SHEET:	DRAWN BY:	CHECKED BY:
1" = 20'	22667	1/9/2023	1 OF 1	A.P.M./J.D.S	P.L.A.

DRAWING No: 22667 PROP SURVEY NHSPC
FIELD BOOK No: "Portsmouth #18"

Tax Map 222 Lot 11

SITE NOTES

1. DESIGN INTENT – THIS PLAN IS INTENDED TO DEPICT A CONCEPTUAL SITE PLAN FOR RESIDENTIAL UNITS.
2. APPROXIMATE LOT AREA: 1.44 AC.±
3. ZONE: SINGLE RESIDENCE RESIDENCE B (SRB)
4. DIMENSIONAL REQUIREMENTS:

		EXISTING	PROPOSED
MIN. LOT AREA:	15,000 S.F.	±62,754 S.F.	>15,000 S.F.
MIN. LAND AREA PER DWELLING UNIT:	15,000 S.F.	±62,754 S.F.	>15,000 S.F.
MIN. STREET FRONTAGE:	100'	±139.8'	100'
MIN. LOT DEPTH:	100'	±434'	100'
FRONT SETBACK:	30'	±33'	30'
SIDE SETBACK:	10'	±40'	10'
REAR SETBACK:	30'	±300'+	30'
MAX. BUILDING HEIGHT:	35'	±13.1'	<35'
MAX. BLDG. COVERAGE:	20%	±5.8%	<20%
MIN. OPEN SPACE:	40%	±94.2%	>40%

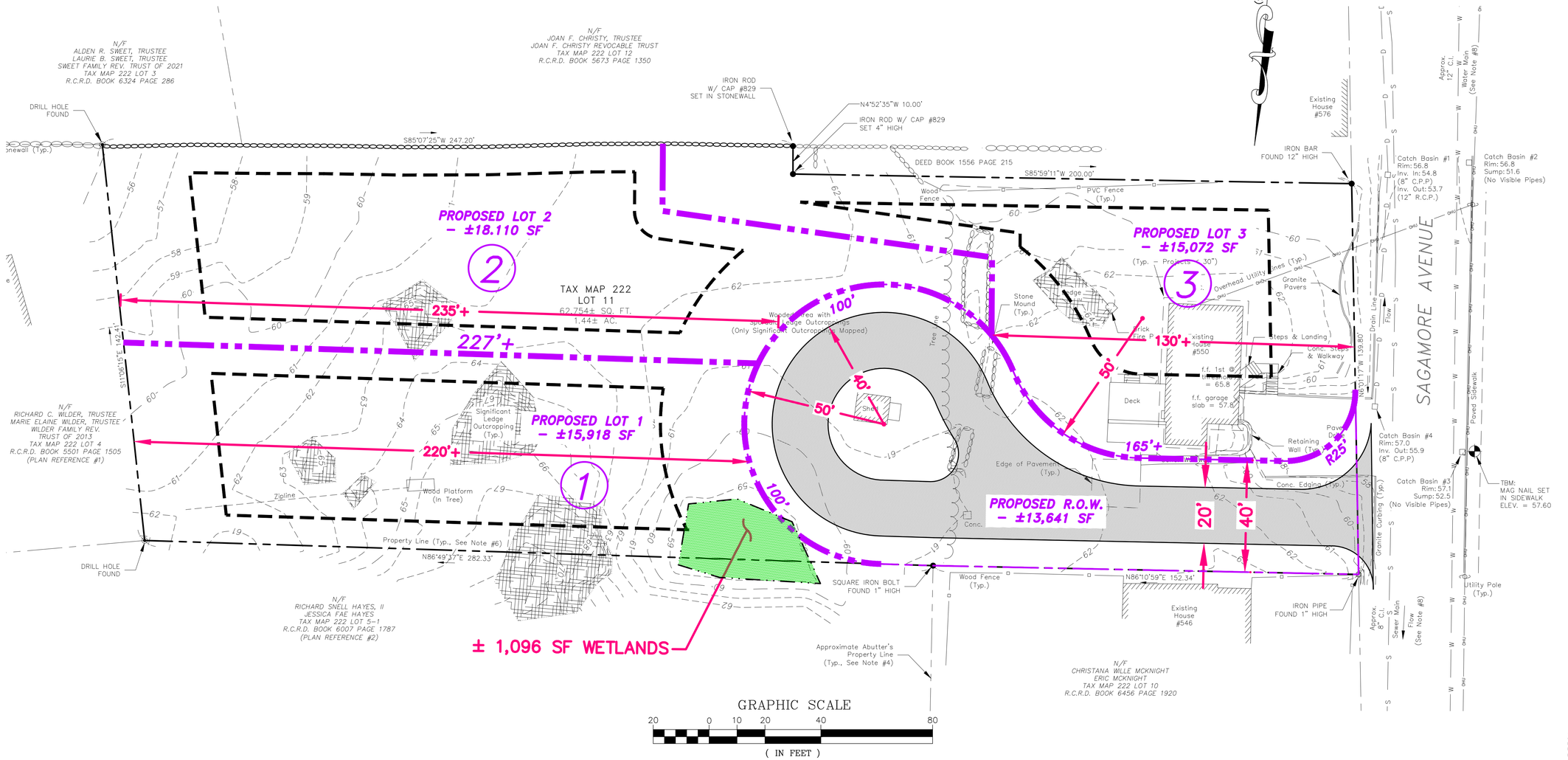
5. THE WETLAND BOUNDARY AS DEPICTED ON THIS PLAN WAS DELINEATED/FLAGGED BY JOSEPH W. NOEL, NEW HAMPSHIRE CERTIFIED SOIL SCIENTIST#17 AND NEW HAMPSHIRE WETLAND SCIENTIST#86, ON MAY 10, 2024. THE DELINEATION WAD CONDUCTED IN ACCORDANCE WITH THE U.S. ARMY CORPS OF ENGINEERS DOCUMENT "CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL", (1987) ALONG THE REQUIRED "REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION", (VERSION 2, JANUARY 2012).

PLAN REFERENCE:

1. "EXISTING CONDITIONS PLAN FOR PROPERTY AT 550 SAGAMORE AVENUE, PORTSMOUTH, NEW HAMSHIRE", DATED 06/03/24, BY NORTH EASTERLY SURVEYING, INC.

WAIVER REQUEST

SECTION VI3.B 40' RIGHT–OF–WAY WHERE 50' IS REQUIRED
SECTION VI3.I ALLOW STREET PROPERTY LINE RADIUS OF 50' WHERE 60' IS REQUIRED
ALLOW 40' OUTSIDE CURB LINE WHERE 50' IS REQUIRED
ALLOW 20'–WIDE PRIVATE ROAD WHERE 32' IS REQUIRED



P5591

ALTUS ENGINEERING
133 Court Street Portsmouth, NH 03801
(603) 433-2335 www.altus-eng.com

NOT FOR CONSTRUCTION

ISSUED FOR: TAC WORK SESSION

ISSUE DATE: JUNE 4, 2024

REVISIONS

NO.	DESCRIPTION	BY	DATE
0	INITIAL SUBMISSION	EDW	06/04/24

DRAWN BY: RMB
APPROVED BY: EDW
DRAWING FILE: 5591CO–1.dwg

SCALE:
22" x 34" – 1" = 20'
11" x 17" – 1" = 40'

OWNER:
FRANCES E. MOUFLOUZE, TED W. ALEX & PATRICIA CAMERON, TRUSTEES

THE FRANCES E. MOUFLOUZE REVOCABLE TRUST OF 2015
936 SOUTH STREET #1
PORTSMOUTH, NH 03801

APPLICANT:
GREEN & COMPANY
11 LAFAYETTE ROAD
P.O. BOX 1297
NORTH HAMPTON, NH 03862

PROJECT:
RESIDENTIAL DEVELOPMENT

TAX MAP 222 LOT 11

550 SAGAMORE AVENUE
PORTSMOUTH, NH

TITLE:
CONCEPTUAL SUBDIVISION PLAN (3 LOT SUBDIVISION)

SHEET NUMBER:
CO - 1

Bosen & Associates
ATTORNEYS AT LAW

John K. Bosen
Admitted in NH & MA

Christopher P. Mulligan
Admitted in NH & ME

Molly C. Ferrara
Admitted in NH & ME

Austin Mikolaities
Admitted in NH

Bernard W. Pelech
1949-2021

July 3, 2024

Mr. Rick Chellman, Chair
City of Portsmouth Planning Board
1 Junkins Avenue
Portsmouth, NH 03801

Re: Preliminary Conceptual Consultation / Design Review Completion
361 Hanover Street

Dear Chairman Chellman:

On behalf of 361 Hanover Steam Factory, LLC, we are pleased to submit one (1) set of hard copies and one electronic file of the following information to support a second request for a Preliminary Conceptual Consultation and a request to complete the Design Review process for the above referenced project:

- Design Review Plans, dated July 3, 2024

Since the initial Preliminary Conceptual Consultation, we have listened to the comments and concerns of this Board and the abutters and redesigned the site to include four (4) buildings in order to allow more light and air into property and give it an overall neighborhood look and feel. As a result, we believe a second Preliminary Conceptual Consultation is warranted. Also, as the completion of the Design Review process included a Public Hearing and site walk we hereby request that these plans be the subject of this process.

The Site Plan depicts Building A as an 18,082 S.F, 4 story building with a Penthouse. It will have 34 dwelling units and 3 workforce housing units. Building B is a 3,116 S.F. two (2 1/2) story building with 4 dwelling units, Building C is a 2,280 two (2) story building with 2 dwelling units (Duplex) and Building D is a 4,320 S.F. three (3 1/2) story building with 8 dwelling units. The project will also provide a total of 69 parking spaces.

The applicant respectfully requests to be placed on the July 18, 2024 Planning Board meeting agenda. If you have any questions or concerns, please do not hesitate to call or email me at jbosen@bosenandassociates.com.

Very truly yours,

John K. Bosen

cc: client
John Chagnon
Nicholas Cracknell

PORTSMOUTH STEAM FACTORY PROJECT

PRELIMINARY CONCEPTUAL REVIEW
- ALTERNATIVE CUP PLAN -

361 HANOVER STREET, PORTSMOUTH, NH

HAMPSHIRE DEVELOPMENT CORPORATION

July 18TH 2024

July 18, 2024

To: Rick Chellman, Planning Board Chair
Re: Preliminary Conceptual Review – Building and Site Design Revisions for 361 Hanover St.

Purpose

The purpose of this submission for Preliminary Conceptual Review is three-fold. First, we would like to present an alternative building and site plan from the so-called "as-of-right" plan that was recently approved for Design Review (see Figure 1).

Figure 1 – Proposed "As-of-Right Plan" showing a large Mixed-Use Building fronting on Hanover St.

As a response to your feedback, we developed an alternative building and site plan – "the CUP Plan" that we believe better addresses your comments, suggestions, and the many issues and concerns expressed by members of the public during the Preliminary Conceptual and Design Review meetings.

Figure 2 – Proposed "CUP Plan" showing three traditionally-designed buildings along Hanover St.

Secondly, we would like to receive input and feedback on our proposed CUP Plan in order to make any final design adjustments prior to filing a formal Site Plan Application. Finally, realizing that we will require zoning relief to implement the CUP Plan, we would like to request the Board consider informally supporting our alternative CUP plan prior to us filing a variance application in August.

Site Plan Elements

As discussed during the Design Review phase of the project, the site planning issues of parking, loading, solid waste, deliveries, drainage, utilities, lighting, landscaping, off-site improvements, and the location of all mechanical equipment will all be formally addressed when a site plan is updated and reviewed by both the Technical Advisory Committee and the Planning Board. We would refer the Board to our submission packet and project narrative, dated April 4th, 2002, and on file with the Planning Department for any questions pertaining to those issues.

Issues Raised during Design Review

As you recall, as part of the public hearing within the Design Review process, several core issues of concern were expressed from both Planning Board members, neighbors, and members of the general public. The core issues included the height, scale, volume, and massing of the proposed buildings. Additionally, there were also concerns about the prospect of ground-floor commercial uses and their potential impact on spill-over street parking, lighting, and noise. Other issues included emergency access concerns via the proposed tunnel, parking and loading areas, and whether the proposed buildings and zoning requirements were consistent with the North End Vision Plan. Other issues of concern related to pedestrian access to Foundry Place, improving on-site drainage, and consideration for a better building design to reflect the historic quality and character of the smaller historic structures within the surrounding neighborhood.

Our Preliminary Response

As discussed during the Design Review process, we listened to Board and public feedback and have re-evaluated the proposed building and site design and re-examined the density, dimensional, and the architectural character of the surrounding neighborhood. Additionally, we have revisited the existing zoning regulations and the goals and objectives of the North End Vision Plan in order to refine the design to better reflect the goals of both the Board and the surrounding neighborhood. In doing so, we re-considered the five (5) following elements as follows: 1) the goals and objectives of the North End Vision Plan; 2) the existing neighborhood context (density and design); 3) the surrounding land use pattern (especially on the ground-floor); 4) the pedestrian circulation; and, 5) the building placement, volume, and design.

1. North End Vision Plan

As listed in Figure 3, the goals and objectives of the North End Vision Plan were focused on generating building and site designs that were both respectful and sensitive to the surrounding context. In particular, the buildings were intended to step up or down in transitional areas like the property at 361 Hanover Street. This stepping element is exactly why the North End Overlay District does not carry over to the parking lot portion of the property along Hanover Street. Additionally, the Vision Plan encourages ground-floor commercial uses to active the sidewalk and enhance the

pedestrian experience. Thus, the Downtown Overlay District (DOD) was extended into much of the North End. Streets were also encouraged to support multi-modal traffic with an emphasis of non-vehicular use of new streets and driveways. Finally, to achieve more vibrant, walkable streets and sidewalks, the zoning also includes incentives for public or civic spaces like shared streets, wide public sidewalks, or public park areas.

Despite the zoning for the North End allowing taller and larger buildings than the surrounding context and mandating ground-floor commercial uses, we developed an alternative plan – the "CUP Plan" – that we believe better reflects the goals and objectives of the North End Vision Plan. The CUP Plan seeks to step the buildings down from the taller buildings along Hill and Hanover Streets to the much shorter and smaller building types along Rock Street.

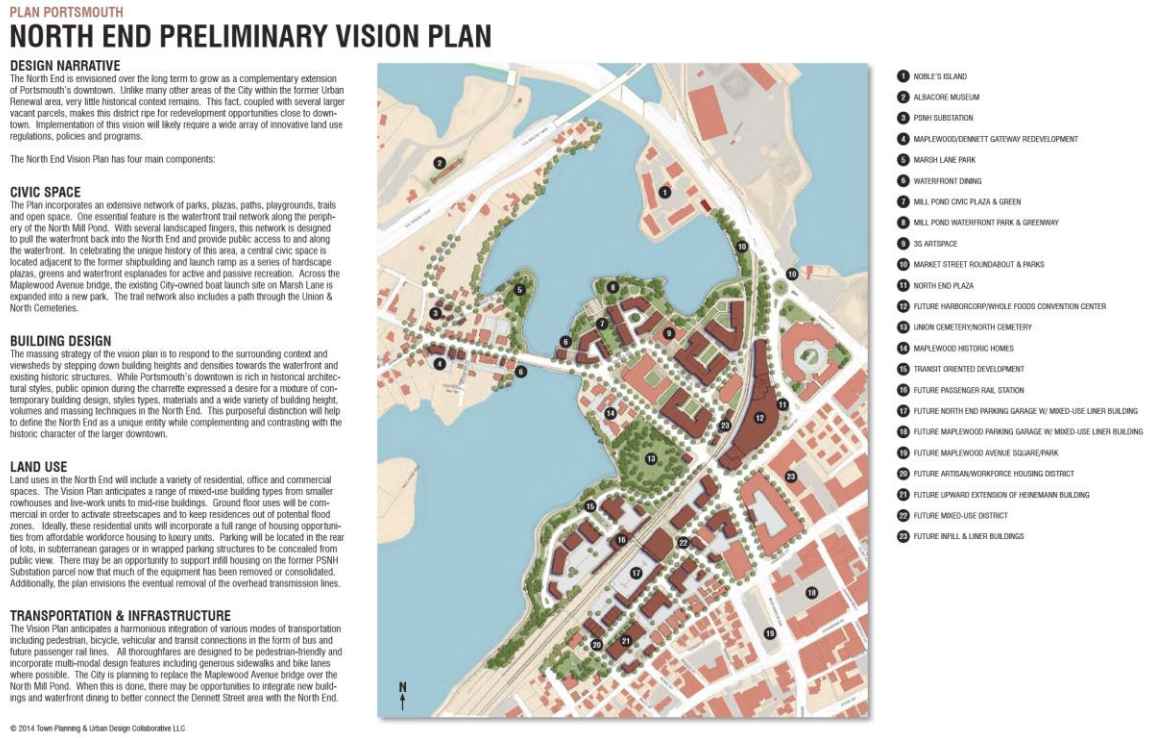


Figure 3 – North End Vision Plan

2. Neighborhood Context

Project density can be defined in a number of ways including, but not limited to, the number of dwelling units, or the height, volume, footprint, or massing of the buildings. When looking at density as a function of the number of dwelling units, Figure 4 illustrates the transition from the high-density developments and land use pattern within the character-district zoning along Foundry Place and Hill Street in the North End with the lower density traditional neighborhoods along Rock or Sudbury Street in the abutting Islington Creek Neighborhood.

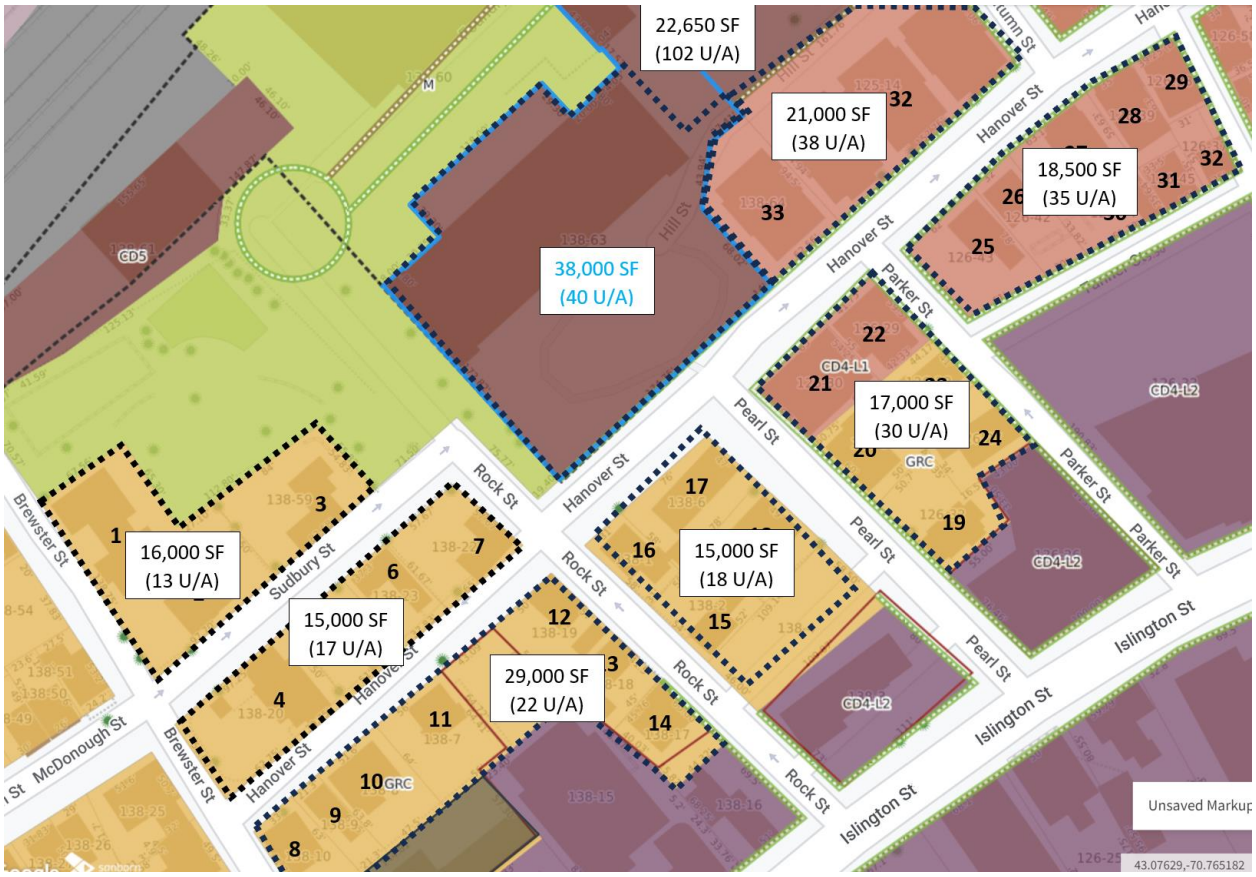


Figure 4 – Existing Neighborhood Density (Estimated Units / Acre)

When looking at the existing and allowed densities in terms of building height, scale, and volume, the variation within the surrounding neighborhood is even more dramatic. For example, within the CD5, buildings are permitted to have footprints as large as 20,000 SF and heights between 40-60' depending on overlay districts. In contrast, new buildings in the abutting CD4-L1 are restricted to much smaller footprints of 2,500 SF (about the size of the Pearl Street Church) and heights of 40-42' (again about the height of the Pearl Street Church). Interestingly, like the character-based zoning, the abutting General Residence C District allows for new buildings to be between 35-43' in height depending on whether parking is provided within the ground-floor of the building.

Perhaps the biggest difference between the GRC, CD4-L1, and the CD5 is the coverage and open space requirements as buildings in the CD5 are allowed to occupy 95% of the lot area and thus, do not require significant open space areas whereas the GRC and CD4-L1 require between 40% and 65% of the lot area to be remain undeveloped for parking or open space.

Coupled with the size of the footprints allowed in the CD5, the high coverage allowance promotes and encourage buildings that are significantly larger than those permitted in the abutting GRC District. Importantly, the allowable density (as reflected by the allowable footprints and building heights) transitions from a high density along Foundry Place and Hill Street (the CD5 district with large footprints and a 50-60' height limitation) to a moderate density along Hanover Street (the CD4-L1 district with smaller footprints and a 40' height limitation) and to a much lower density along Tanner, Pearl, and Parker Streets (the GRC district with small footprints and a 35-43' height limitation) before increasing to a moderate density allows along Islington Street (the CD4-L2). Thus,

our evaluation of the surrounding context suggests that we consider reconfiguring the density and volume of the so-called “As-of-Right Plan” to substantially reduce the building height, volume, and footprints along Hanover Street.

3. Ground-Floor Commercial Uses

Although the Downtown Overlay District (DOD) includes the total land area of 361 Hanover Street it is important to acknowledge that there are no other properties fronting on Hanover Street included in the DOD. Within Downtown Portsmouth, DOD requires ground-floor commercial uses with the intention to activate the street edge and enhance the pedestrian experience.

Figure 5 – Existing Streetscape showing Residential Land Use Pattern on Hanover St.

Unfortunately, in this particular area along Hanover Street Figure 6 shows that only 293 Hanover Street is designed for and used as a commercial use. Moreover, except for the non-conforming Peral Street Church property, all other nearby properties on Hanover Street and the intersecting streets are all residential uses (see Figure 5).

Figure 6- Commercial Use at 293 Hanover Street

To the east, Bridge Street is essentially the edge of the downtown commercial district and Islington Street – a mixed-use commercial corridor linking the downtown to the West End – provides intermittent commercial uses that support the adjacent neighborhoods (see Figure 7).

Figure 7 - Commercial Use at 63 Islington Street

Thus, along with the question of the economic viability of this location, the concerns and compatibility issues with the surrounding residential neighborhood led us to continue to evaluate the more suitable ground-floor use of residential dwelling units; consistent with the existing neighborhood context.

4. Pedestrian Circulation

During the Design Review process suggestions were made to consider and provide for pedestrian connections between the proposed project and the public parking garage on Foundry Place. In review of the serious physical challenges of opening the City's existing retaining wall along Foundry Place to introduce a stairway to Foundry Place we evaluated other less-challenging options. In particular, we reviewed the approved site plans for the abutting 53 unit project at 89 Foundry Place. The approved plans show a 6-8' wide public pedestrian accessway connecting the entrance of the public parking garage on Foundry Place with Hill Street (see Figure 8 below). The entrance to the public parking garage is less than 300 feet from the proposed multi-modal way that is proposed within the project. Thus, visitors and any spillover parking can utilize this pedestrian passageway to easily access the Foundry Place Public Parking Garage.

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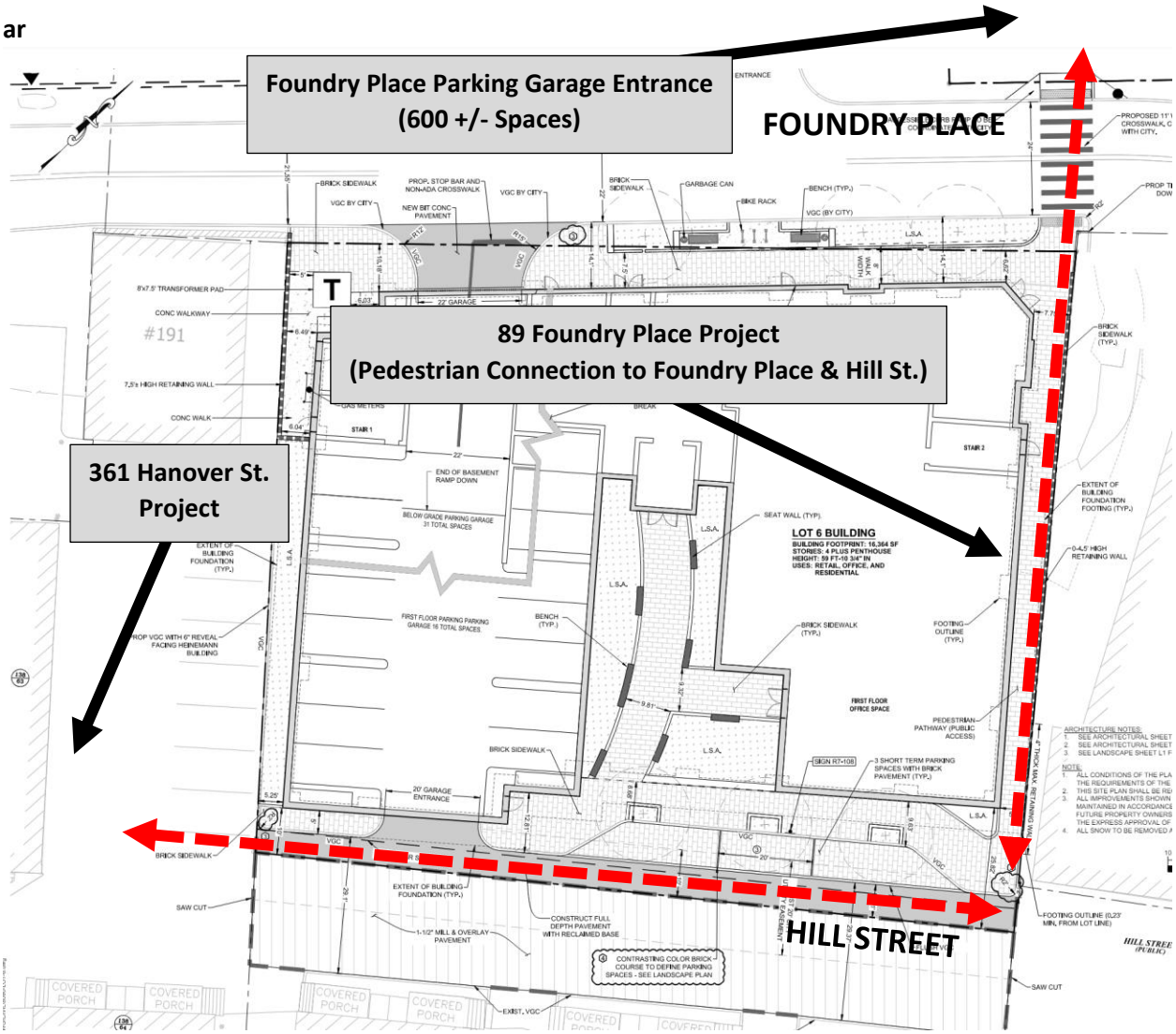


Figure 8 – Pedestrian Connector at 89 Foundry Place

5. Building Design

Some Board members and most members of the public suggested we reevaluate the proposed architectural style of the proposed building(s) along Hanover Street with a clear preference for buildings that are more consistent with the quality and historic character of the surrounding historic buildings. More specifically, suggestions were made for smaller building footprints, reduced height and volume, and the application of traditional building principles that would better reflect the historic architecture of the surrounding neighborhood.

Alternative CUP Plan

Overall Building and Site Design

The alternative CUP Plan seeks to address the core issues listed above by adhering to the goals and objectives of the North End Vision Plan. Moreover, it also seeks to redevelop the property by employing a context-sensitive approach that steps down and transitions from a high-density newer development along Foundry Place and Hill Street to a moderate density along Hanover Street and lower density along Rock and Sudbury Streets.

Figure 9 – Proposed "As-of-Right Plan" showing a large Mixed-Use Building fronting on Hanover St.

Figure 9 illustrates how the previously proposed 3 ½ story mansard building along Hanover Street occupies the full street frontage along Hanover Street and overpowers some of the smaller abutting buildings. In contrast, Figure 10 illustrates the alternative CUP Plan where the larger building has been broken into three separate buildings with reduced height and volume to better align with the lower density context of the western side of the site.

As we discussed within the Design Review process, the CUP Plan also proposes to increase the height of the Kearsarge Building along Foundry Place – in a historically sensitive manner – to reestablish the volume, height, and historic character of the building and support the transfer of development rights from Hanover Street to Foundry Place as intended in the North End Vision Plan and the Character-Based Zoning.

Figure 10 – Proposed Lower-Scale, Traditionally-Designed Buildings along Hanover Street

Ground-Floor Residential Uses

Given the questions of economic viability and the potential for adverse impacts on the surrounding neighborhood (i.e. spillover parking, noise, and light pollution), the CUP Plan proposes a residential ground-floor use in all four buildings.

Building Placement & Open Space

As shown in Figure 11, there is parking available on-site to support up to 48 dwelling units within the four (4) proposed buildings.

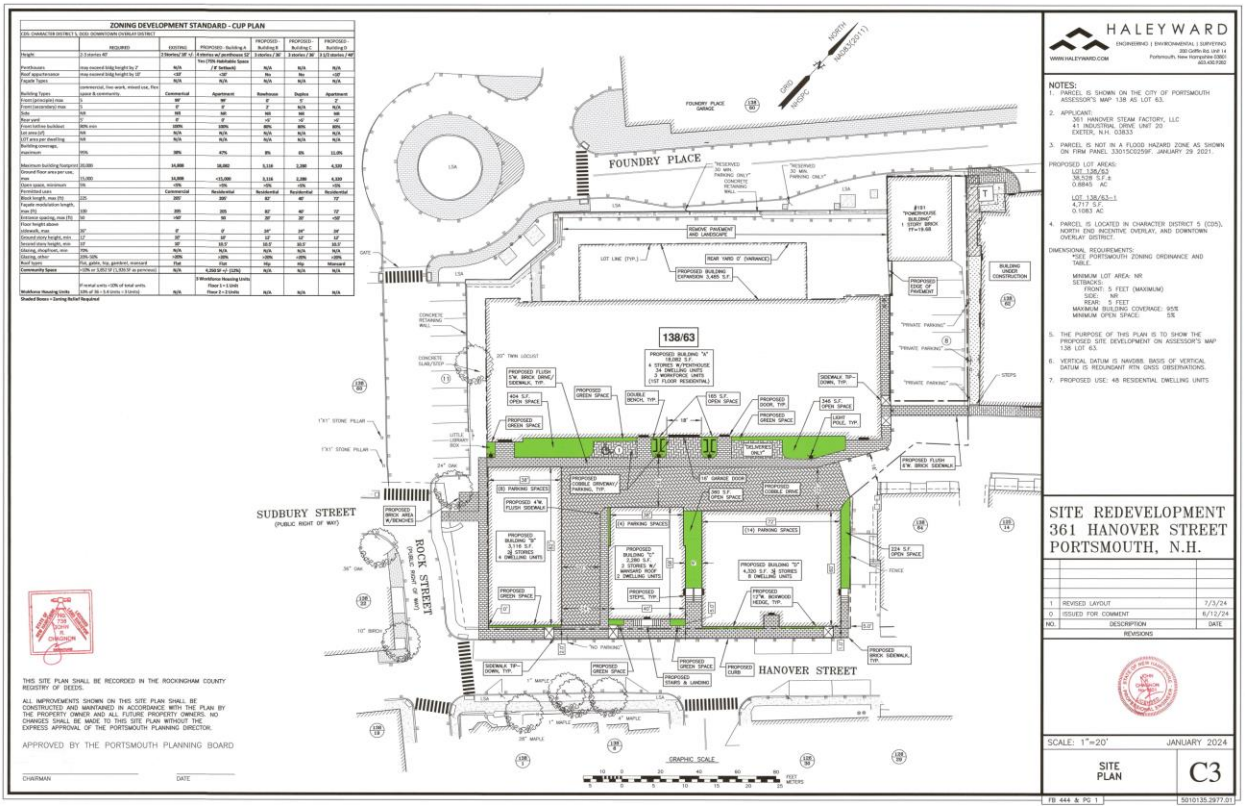


Figure 11 – Alternative CUP Plan showing Proposed Buildings and Driveways and Open Space

Building Design

As shown in Figures 12-15, all four buildings have been redesigned to be more consistent with the historic character of the surrounding neighborhood. Understanding this property is located outside the Historic District, we have intentionally redesigned these buildings to reference the historic elements in the surrounding context versus the more contemporary buildings being constructed along Foundry Place and Deer Street in the North End.

Figure 12 – Building A: 4½-Story "Apartment" Building (the Kearsarge Building)

Figure 13 – Building B: 3-Story "Rowhouse" Building

Figure 14 – Building C: 3-Story "Duplex" Building

Figure 15 - Building D: 3½-Story "Apartment" Building

Community Space

As required under the CUP, at least 10% (3,853 SF +/-) of the property would be deeded as Community Space. As shown on Figure 16, the proposed Community Space would be a 4,500 +/- SF Shared Multi-Modal Way connecting Rock Street to Hill Street. The shared street would include formal landscaping, lighting and street furniture.

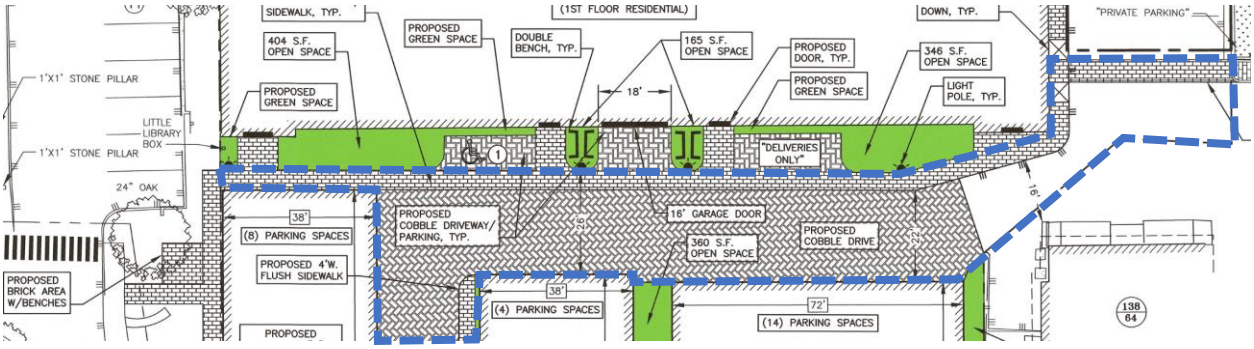


Figure 16 – Proposed Community Space - Multi-Modal Way

Workforce Housing

As required under the CUP, at least 10% of the proposed dwelling units would be deed restricted as rental Workforce Housing Units and be rented to a household with an income of no more than 60% of the median family income for a 3-person household. Such units will be at least 600 SF in GFA and are proposed to be located within the 1st and 2nd floor of Building A (the only building located within the North End Incentive Overlay District).

Zoning Relief

Table 1 shows how the proposed four (4) buildings align with the development standards for the CD5.

ZONING DEVELOPMENT STANDARD - CUP PLAN						
CD5: CHARACTER DISTRICT 5, DOD: DOWNTOWN OVERLAY DISTRICT						
	REQUIRED	EXISTING	PROPOSED - Building A	PROPOSED - Building B	PROPOSED - Building C	PROPOSED - Building D
Height	2-3 stories 40'	2 Stories/ 18' +/-	4 stories w/ penthouse 52'	3 stories / 36'	3 stories / 36'	3 1/2 stories / 40'
Penthouses	may exceed bldg height by 2'	N/A	Yes (75% Habitable Space / 8' Setback)	N/A	N/A	N/A
Roof appurtenance	may exceed bldg height by 10'	<10'	<10'	No	No	<10'
Façade Types		N/A	N/A	N/A	N/A	N/A
Building Types	commercial, live-work, mixed use, flex space & community.	Commerical	Apartment	Rowhouse	Duplex	Apartment
Front (principle) max	5	99'	99'	0'	5'	2'
Front (secondary) max	5	0'	0'	2'	N/A	N/A
Side	NR	NR	NR	NR	NR	NR
Rear yard	5'	0'	0'	>5'	>5'	>5'
Front lotline buildout	80% min	100%	100%	80%	80%	80%
Lot area (sf)	NR	N/A	N/A	N/A	N/A	N/A
LOT area per dwelling	NR	N/A	N/A	N/A	N/A	N/A
Building coverage, maximum	95%	38%	47%	8%	6%	11.0%
Maximum building footprint	20,000	14,808	18,082	3,116	2,280	4,320
Ground floor area per use, max	15,000	14,808	<15,000	3,116	2,280	4,320
Open space, minimum	5%	<5%	>5%	>5%	>5%	>5%
Permitted uses		Commercial	Residential	Residential	Residential	Residential
Block length, max (ft)	225	205'	205'	82'	40'	72'
Façade modulation length, max (ft)	100	205	205	82'	40'	72'
Entrance spacing, max (ft)	50	>50'	50	20'	20'	<50'
Floor height above sidewalk, max	36"	0'	0'	24"	24"	24'
Ground story height, min	12'	10'	10'	12'	12'	12'
Second story height, min	10'	10'	10.5'	10.5'	10.5'	10.5'
Glazing, shopfront, min	70%	N/A	N/A	N/A	N/A	N/A
Glazing, other	20%-50%	>20%	>20%	>20%	>20%	>20%
Roof types	flat, gable, hip, gambrel, mansard	Flat	Flat	Hip	Hip	Mansard
Community Space	>10% or 3,852 SF (1,926 SF as pervious)	N/A	4,250 SF +/- (12%)	N/A	N/A	N/A
Wokforce Housing Units	If rental units =10% of total units. 10% of 36 = 3.4 Units = 3 Units)	N/A	3 Workforce Housing Units Floor 1 = 1 Unit Floor 2 = 2 Units	N/A	N/A	N/A
Shaded Boxes = Zoning Relief Required						

Table 1 – Zoning Table showing Development Standards for each Building

As illustrated with the shaded boxes in Table 1, to support the CUP Plan, zoning relief from the Board of Adjustment (BOA) will be necessary. The following variances are required to permit and construct the plan:

1. To allow the ground-floor use of the buildings to be residential.

2. To allow for an “apartment”, “rowhouse”, and “duplex” building type in the CD5.
3. To allow the ground floor height of Building A (the Kearsarge Building) to be 10’ versus 12’.
4. To allow the penthouse level of Building A (the Kearsarge Building) to exceed 50% of the total floor area of the floor below and have a setback of 8’ from the roof edge.

Summary

After consideration of the many valuable comments, issues, concerns, and suggestions provided by the Board and members of the public within the Design Review process for the “As-of-Right Plan”, we believe the proposed CUP Plan meets the goals and objectives of the North End Vision Plan and, subject to the granting of zoning relief from the Board of Adjustment, exceeds the findings and criteria needed for approval of a CUP.

In closing, we would respectfully request the Board consider an informal vote in support for the CUP Plan. Doing so would not only acknowledge our collective efforts to address the concerns raised during the Design Review process but also “right-size” this development and demonstrate our common goals to make this project a success for urban infill and redevelopment in downtown Portsmouth. Moreover, it would also be likely to have a positive effect on the BOA’s review and provide them a deeper appreciation and understanding of how these design changes were collaboratively developed. In the end, we believe this CUP Plan better aligns with the Board’s and the public’s strong desire for a more balanced, respectful, and context-sensitive, redevelopment of this property; one that also includes Community Space and Workforce Housing.

PROPOSED DEVELOPMENT

361 HANOVER STREET
PORTSMOUTH, NEW HAMPSHIRE
DESIGN REVIEW PLANS

OWNER/APPLICANT:
361 HANOVER STEAM FACTORY, LLC
41 INDUSTRIAL DRIVE UNIT 20
EXETER, NH 03833
TEL. (603) 235-5475

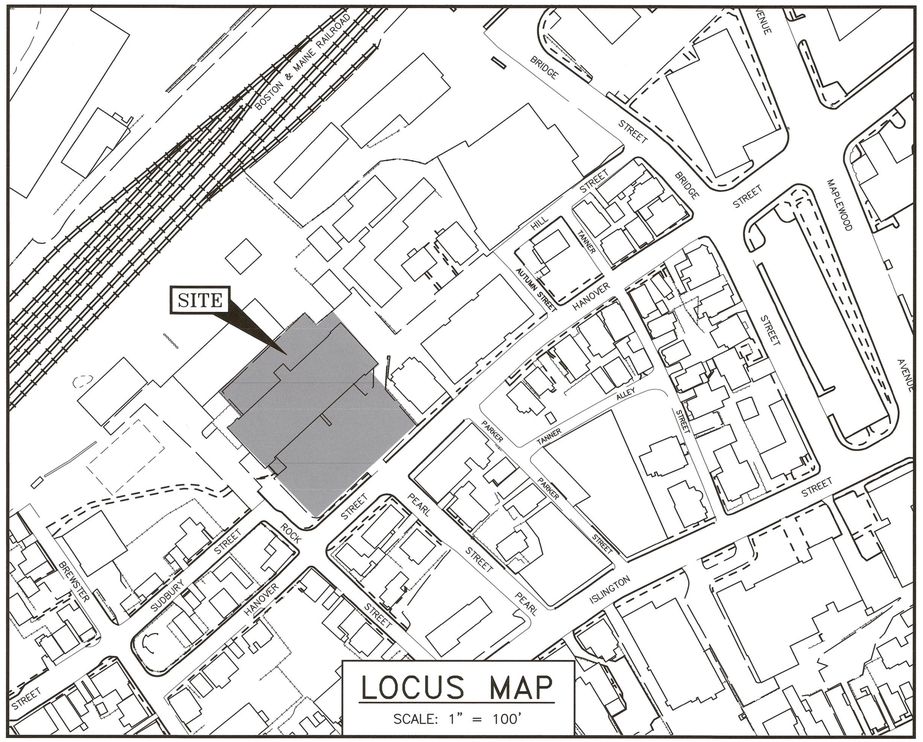
CIVIL ENGINEER/LAND SURVEYOR:
AMBIT ENGINEERING, INC.
200 GRIFFIN ROAD, UNIT 3
PORTSMOUTH, N.H. 03801
TEL. (603) 430-9282

ARCHITECT:
SCOTT BROWN
29 WATER STREET, SUITE 209
NEWBURYPORT, MA 01950
TEL. (978) 465-3535

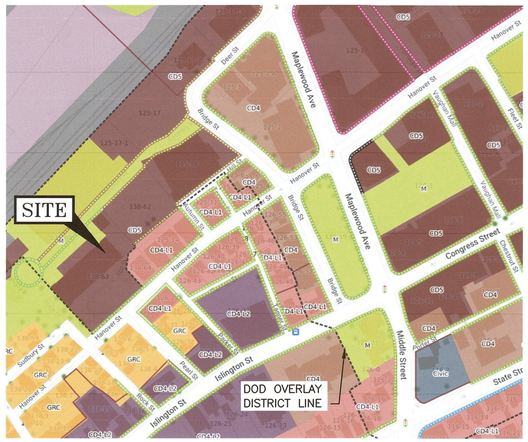
PLANNING CONSULTANT:
NICHOLAS CRACKNELL
TEL. (978) 270-4789

LAND USE ATTORNEY:
BOSEN & ASSOCIATES
266 MIDDLE STREET
PORTSMOUTH, N.H. 03801
TEL. (603) 427-5500

PERMIT LIST:
PORTSMOUTH HDC:
PORTSMOUTH ZONING BOARD:
PORTSMOUTH SITE REVIEW:
PORTSMOUTH CONDITIONAL USE PERMIT:



LOCUS MAP
SCALE: 1" = 100'



MAP 10.5A21A
CHARACTER DISTRICTS AND CIVIC DISTRICTS

Character Districts
- CD5 Character District 5
- CD4 Character District 4
- CD4-W Character District 4-W
- CD4-L1 Character District 4-L1
- CD4-L2 Character District 4-L2

Civic District
- Civic District

Municipal District
- Municipal District

Overlay Districts
- OLOD Osprey Landing Overlay District
- Downtown Overlay District
- Historic District

MAP 10.5A21B
BUILDING HEIGHT STANDARDS

Height requirement area	Maximum building height*
1 Story	20'
2 Stories	35'
2 Stories (short 3rd*)	35'
2-3 Stories	40'
2-3 Stories (short 4th*)	45'
2-4 Stories	50'
2-4 Stories (short 5th*)	60'
2-5 Stories	60'

*Penthouse Levels may exceed the building height by 2 feet.

PORTSMOUTH APPROVAL CONDITIONS NOTE:
ALL CONDITIONS ON THIS PLAN SET SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE CITY OF PORTSMOUTH SITE PLAN REVIEW REGULATIONS.

APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN _____ DATE _____

INDEX OF SHEETS

DWG NO.	
–	SUBDIVISION PLAN
–	SITE ORTHOPHOTO
C1	EXISTING CONDITIONS PLAN
C2	DEMOLITION PLAN
C3	SITE PLAN
–	LICENSE AREA PLAN

UTILITY CONTACTS

ELECTRIC:
EVERSOURCE
1700 LAFAYETTE ROAD
PORTSMOUTH, N.H. 03801
Tel. (603) 436-7708, Ext. 555.5678
ATTN: MICHAEL BUSBY, P.E. (MANAGER)

NATURAL GAS:
UNITIL
325 WEST ROAD
PORTSMOUTH, N.H. 03801
Tel. (603) 294-5144
ATTN: DAVE BEAULIEU

CABLE:
COMCAST
155 COMMERCE WAY
PORTSMOUTH, N.H. 03801
Tel. (603) 679-5695 (X1037)
ATTN: MIKE COLLINS

SEWER & WATER:
PORTSMOUTH DEPARTMENT OF PUBLIC WORKS
680 PEVERLY HILL ROAD
PORTSMOUTH, N.H. 03801
Tel. (603) 427-1530
ATTN: JIM TOW

COMMUNICATIONS:
FAIRPOINT COMMUNICATIONS
JOE CONSIDINE
1575 GREENLAND ROAD
GREENLAND, N.H. 03840
Tel. (603) 427-5525

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1-888-344-7233
CALL TOLL FREE

LEGEND:

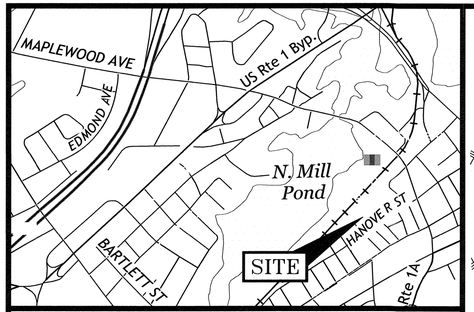
EXISTING	PROPOSED	
		PROPERTY LINE
		SETBACK
S	S	SEWER PIPE
SL	SL	SEWER LATERAL
G	G	GAS LINE
D	D	STORM DRAIN
W	W	WATER LINE
WS	WS	WATER SERVICE
UGE	UGE	UNDERGROUND ELECTRIC
OHW	OHW	OVERHEAD ELECTRIC/WIRES
	UD	FOUNDATION DRAIN
		EDGE OF PAVEMENT (EP)
100	100	CONTOUR
97x3	98x0	SPOT ELEVATION
		UTILITY POLE
		WALL MOUNTED EXTERIOR LIGHTS
		TRANSFORMER ON CONCRETE PAD
		ELECTRIC HANDHOLD
WS	WS GS	SHUT OFFS (WATER/GAS)
	GV	GATE VALVE
	HYD	HYDRANT
CB	CB	CATCH BASIN
S	SMH	SEWER MANHOLE
D	DMH	DRAIN MANHOLE
T	TMH	TELEPHONE MANHOLE
14	14	PARKING SPACE COUNT
PM		PARKING METER
LSA		LANDSCAPED AREA
TBD	TBD	TO BE DETERMINED
CI	CI	CAST IRON PIPE
COP	COP	COPPER PIPE
DI	DI	DUCTILE IRON PIPE
PVC	PVC	POLYVINYL CHLORIDE PIPE
RCP	RCP	REINFORCED CONCRETE PIPE
AC	–	ASBESTOS CEMENT PIPE
VC	VC	VITRIFIED CLAY PIPE
EP	EP	EDGE OF PAVEMENT
EL.	EL.	ELEVATION
FF	FF	FINISHED FLOOR
INV	INV	INVERT
S =	S =	SLOPE FT/FT
TBM	TBM	TEMPORARY BENCH MARK
TYP	TYP	TYPICAL

DESIGN APPLICATION PLANS
PROPOSED DEVELOPMENT
361 HANOVER STREET
PORTSMOUTH, N.H.

HALEYWARD
ENGINEERING | ENVIRONMENTAL | SURVEYING
200 Griffin Rd. Unit 14
Portsmouth, New Hampshire 03801
603.430.9282
WWW.HALEYWARD.COM

PLAN SET SUBMITTAL DATE: 3 JULY 2024

5010135.2977.01



LOCATION MAP SCALE: 1" = 1000'

PLAN REFERENCES:

1) "PLAN OF LAND IN PORTSMOUTH, N.H. PORTSMOUTH MFG & POWER CO. TO FRANKIE BROOKS" BY JOHN W. DURGIN. DA TED FEBRUARY 191B. RCRD PLAN 078.

2) "SUBDIVISION OF LAND OF PORTSMOUTH MFG. & POWER CO. PORTSMOUTH, N.H." BY JOHN W. DURGIN. DATED NOVEMBER 1925. RCRD PLAN #36B.

3) "LAND IN PORTSMOUTH, N.H. PORTS. MFG. & POWER CO. TO HAROLD S. WOODS" BY JOHN W. DURGIN. DATED NOVEMBER 1926. RCRD PLAN #389.

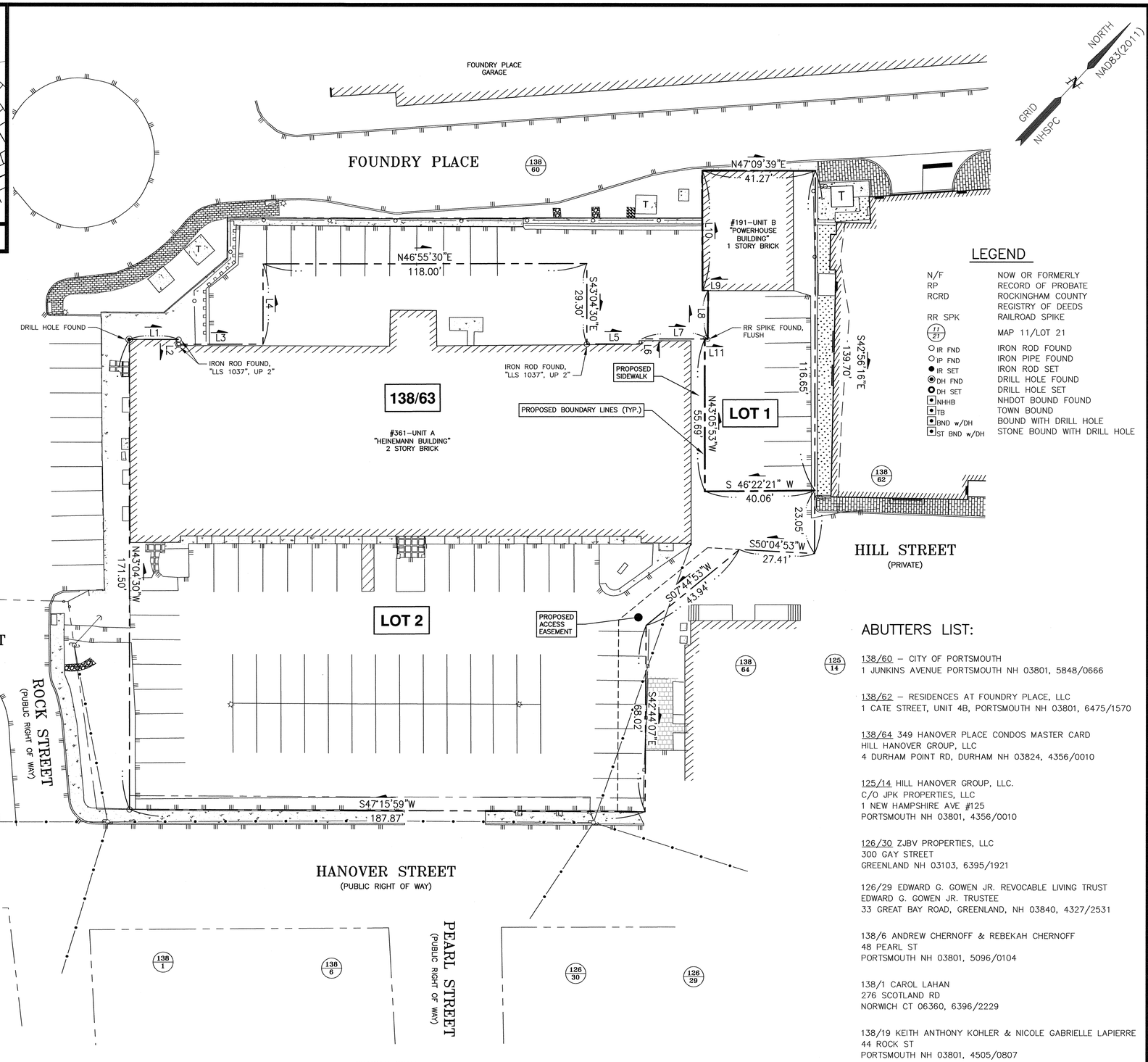
4) "CONDOMINIUM SITE PLAN FOR HANOVER PLACE CONDOMINIUM 349 HANOVER STREET COUNTY OF ROCKINGHAM PORTSMOUTH, NH" BY MILLETTE, SPRAGUE & COLWELL, INC. DATED SEPTEMBER 28, 2004 LAST REVISED DECEMBER 20, 2005. RCRD PLAN D-33379.

5) "CONSOLIDATION & SUBDIVISION PLAN TAX MAP 125, LOT 17 & TAX MAP 138, LOT 62 DEER STREET ASSOCIATES BRIDGE, DEER & HILL STREETS CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STA TE OF NEW HAMPSHIRE" BY AMBIT ENGINEERING, INC. DA TED JULY 2015. RCRD PLAN D-39699.

6) "KEARSARGE MILLS CONDOMINIUM PLANS" BY KIMBALL CHASE COMPANY, INC. DATED APRIL 15, 1986. RCRD PLAN D-14855.

7) "BOUNDARY LINE AGREEMENT PLAN KEARSARGE MILL CONDOMINIUMS PORTSMOUTH, N.H." BY JONES & BEACH ENGINEERS, INC. DATED APRIL 10, 1997 LAST REVISED APRIL 21, 1997. RCRD PLAN D-25421.

8) "AMENDED SITE PLAN, KEARSARGE MILL CONDOMINIUMS, 1 HANOVER STREET PORTSMOUTH, NH" BY KIMBALL CHASE CONSULTING ENGINEERS DATED 04-14-06 AND LAST REVISED 02-16-07. RCRD PLAN D-34716.



LEGEND

N/F	NOW OR FORMERLY
RP	RECORD OF PROBATE
RCRD	ROCKINGHAM COUNTY REGISTRY OF DEEDS
RR SPK	RAILROAD SPIKE
11/21	MAP 11/LOT 21
○ IR FND	IRON ROD FOUND
○ IP FND	IRON PIPE FOUND
● IR SET	IRON ROD SET
◉ DH FND	DRILL HOLE FOUND
◉ DH SET	DRILL HOLE SET
◉ NHHB	NHDOT BOUND FOUND
◉ TB	TOWN BOUND
◉ BND w/DH	BOUND WITH DRILL HOLE
◉ ST BND w/DH	STONE BOUND WITH DRILL HOLE

LENGTH TABLE

LINE	BEARING	DISTANCE
L1	N47°00'11"E	18.00'
L2	S43°03'50"E	1.78'
L3	N46°55'30"E	30.75'
L4	N43°04'30"W	29.30'
L5	N46°55'30"E	20.00'
L6	N43°04'30"W	1.80'
L7	N46°55'30"E	24.05'
L8	N42°30'12"W	17.65'
L9	S46°42'22"W	2.04'
L10	N43°17'38"W	43.88'
L11	N46°55'30"E	1.12'

"I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN ACCURACY OF THE CLOSED TRAVERSE THAT EXCEEDS THE PRECISION OF 1:15,000."

4.3.24

JOHN R. CHAGNON, LLS DATE

APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN DATE

GRAPHIC SCALE

10 0 20 40 60 80 FEET
5 0 5 10 15 20 25 METERS

ABUTTERS LIST:

138/60 – CITY OF PORTSMOUTH
1 JUNKINS AVENUE PORTSMOUTH NH 03801, 5848/0666

138/62 – RESIDENCES AT FOUNDRY PLACE, LLC
1 CATE STREET, UNIT 4B, PORTSMOUTH NH 03801, 6475/1570

138/64 349 HANOVER PLACE CONDOS MASTER CARD
HILL HANOVER GROUP, LLC
4 DURHAM POINT RD, DURHAM NH 03824, 4356/0010

125/14 HILL HANOVER GROUP, LLC.
C/O JPK PROPERTIES, LLC
1 NEW HAMPSHIRE AVE #125
PORTSMOUTH NH 03801, 4356/0010

126/30 ZJBV PROPERTIES, LLC
300 GAY STREET
GREENLAND NH 03103, 6395/1921

126/29 EDWARD G. GOWEN JR. REVOCABLE LIVING TRUST
EDWARD G. GOWEN JR. TRUSTEE
33 GREAT BAY ROAD, GREENLAND, NH 03840, 4327/2531

138/6 ANDREW CHERNOFF & REBEKAH CHERNOFF
48 PEARL ST
PORTSMOUTH NH 03801, 5096/0104

138/1 CAROL LAHAN
276 SCOTLAND RD
NORWICH CT 06360, 6396/2229

138/19 KEITH ANTHONY KOHLER & NICOLE GABRIELLE LAPIERRE
44 ROCK ST
PORTSMOUTH NH 03801, 4505/0807

138/22 SEAN G. CAUGHRAN
407 HANOVER ST
PORTSMOUTH NH 03801, 3289/1071

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.
WWW.HALEYWARD.COM
200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315

NOTES:

1) PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSORS MAP 138 AS LOT 63.

2) OWNERS OF RECORD:

UNIT A:
361 HANOVER STEAM FACTORY, LLC
41 INDUSTRIAL DRIVE UNIT 20
EXETER, N.H. 03833
6352/2959

UNIT B:
POWERHOUSE REALTY TRUST
C/O ADAMS DAVID B. TRUSTEE
210 GATES STREET
PORTSMOUTH, NH 03801
5419/1223

3) PARCEL IS NOT IN A SPECIAL FLOOD HAZARD AREA AS SHOWN ON FIRM PANEL 33015C0259F. EFFECTIVE JANUARY 29, 2021.

4) LOT AREAS:

EXISTING
43,245 S.F.
0.9928 AC.

PROPOSED LOT 1
4,717 S.F.
0.1083 AC.

PROPOSED LOT 2
38,528 S.F.
0.8845 AC.

5) PARCEL IS LOCATED IN CHARACTER DISTRICT 5 (CD5), NORTH END INCENTIVE OVERLAY DISTRICT (NEIOD) AND DOWNTOWN OVERLAY DISTRICT.

6) THE PURPOSE OF THIS PLAN IS TO SHOW A PROPOSED SUBDIVISION OF TAX MAP 139, LOT 63 IN PORTSMOUTH, NH INTO 2 LOTS.

7) PARCEL IS BURDENED BY THE FOLLOWING EASEMENTS:

A) ACCESS EASEMENT TO THE CITY OF PORTSMOUTH TO ALLOW ACCESS TO A PARKING AREA. SEE R.C.R.D. 4735/2971

B) ACCESS EASEMENT TO HANOVER PLACE CONDOMINIUM ASSOCIATION. THIS EASEMENT TO BE RE-DEFINED AS SHOWN HEREON.

8) THE PARCEL HAS THE BENEFIT OF A REVOCABLE LICENSE BETWEEN THE CITY OF PORTSMOUTH AND THE KEARSARGE MILL UNIT ON THE PLAN ENTITLED "KEARSARGE MILL CONDOMINIUMS HANOVER STREET, PORTSMOUTH, NH SITE PLAN AMENDMENT" PREPARED BY KIMBALL CHASE CONSULTING ENGINEERS DATED APRIL 14, 2006, LICENSE AND SITE PLAN ARE AVAILABLE WITH THE RECORDS OF THE CITY OF PORTSMOUTH, SEE ALSO PLAN REFERENCE #6.

9) PROPERTY CORNERS WILL BE SET PRIOR TO RECORDING.

NO.	DESCRIPTION	DATE
0	ISSUED FOR COMMENT	4/3/24

REVISIONS

SUBDIVISION PLAN
TAX MAP 138 – LOT 63

KEARSAGE MILL UNIT OWNERS ASSOCIATION

OWNERS: 361 HANOVER STEAM FACTORY, LLC & POWERHOUSE REALTY TRUST
FOUNDRY PLACE & HANOVER STREET
CITY OF PORTSMOUTH
COUNTY OF ROCKINGHAM
STATE OF NEW HAMPSHIRE

SCALE: 1"=20' JANUARY 2024

FB 444 PG 1 5010135.2977.01

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.
WWW.HALEYWARD.COM
200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315

NOTES:

1) PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSORS MAP 138 AS LOT 63.

2) APPLICANT:
361 HANOVER STEAM FACTORY, LLC
41 INDUSTRIAL DRIVE UNIT 20
EXETER, NH 03833
6352/2959

3) THE PURPOSE OF THIS PLAN IS TO SHOW SITE FEATURES AS OF FEBRUARY 2023 ON THE CITY OF PORTSMOUTH ASSESSOR'S MAP 138 LOT 63.

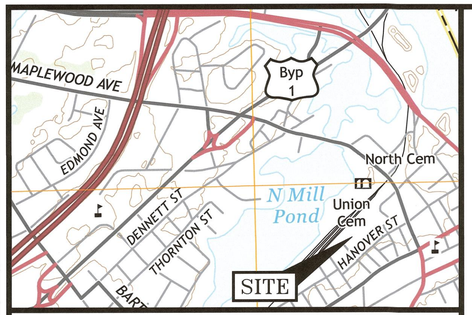
NO.	DESCRIPTION	DATE
0	ISSUED FOR COMMENT	4/3/24

REVISIONS

SITE ORTHOPHOTO
TAX MAP 138 – LOT 63

361 HANOVER STEAM FACTORY, LLC
FOUNDRY PLACE & ROCK STREET
CITY OF PORTSMOUTH
COUNTY OF ROCKINGHAM
STATE OF NEW HAMPSHIRE

SCALE: 1"=20'
FEBRUARY 2023
5010135–2977.01



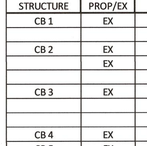
LOCATION MAP SCALE: 1"=1,000'

DRAINAGE STRUCTURE TABLE

STRUCTURE	PROP/EX	RIM	PIPE SIZE/TYPE	INVERT IN	INVERT OUT	DIRECTION
CB 1	EX	20.66	8" CPP		17.46	SW
			8" CPP	17.51		SE
CB 2	EX	20.35	12" CPP		15.70	N
	EX		8" CPP	15.80		NE
			8" CPP	16..50		SE
CB 3	EX	19.29	12" CPP		15.64	NW
			8" CPP	16.24		W
			8" CPP	16.29		S
CB 4	EX	18.90	12" CPP		15.65	SE
CB 5	EX	15.00	12" CPP		10.00	SW
			12" CPP	10.00		SE
CB 6	EX	15.60	12" CPP		12.85	SW
			8" CPP	13.20		NE
CB 7	EX	17.43	8" CPP		16.28	SW
CB 8	EX	12.15	12" CPP		7.45	NW
CB 9&10	EX	9.76	12" CPP		5.86	NE
CB 11	EX	10.07	12" CPP		6.17	SE
CB 12	EX	10.22	12" CPP		6.92	W
DMH 1	EX	19.81	12" CPP		15.56	SW
			12" CPP	15.56		E
DMH 2	EX	19.08	12" CPP		15.03	SW
			12" CPP	15.03		NE
			12" CPP	15.43		NW
			12" CPP	15.43		SE
DMH 3	EX	15.30	12" CPP		10.65	NW
			12" CPP	10.65		NE
DMH 4	EX	11.86	18" CPP		5.46	NW
			15" CPP	5.56		NE
			4" PVC	9.36		S
DMH 5	EX	9.87	NO DATA			
DMH 6	EX	11.84	NO DATA			
DMH 7	EX	10.19	18" CPP		6.29	SW
			12" CPP	6.44		NW
			12" CPP	6.39		E

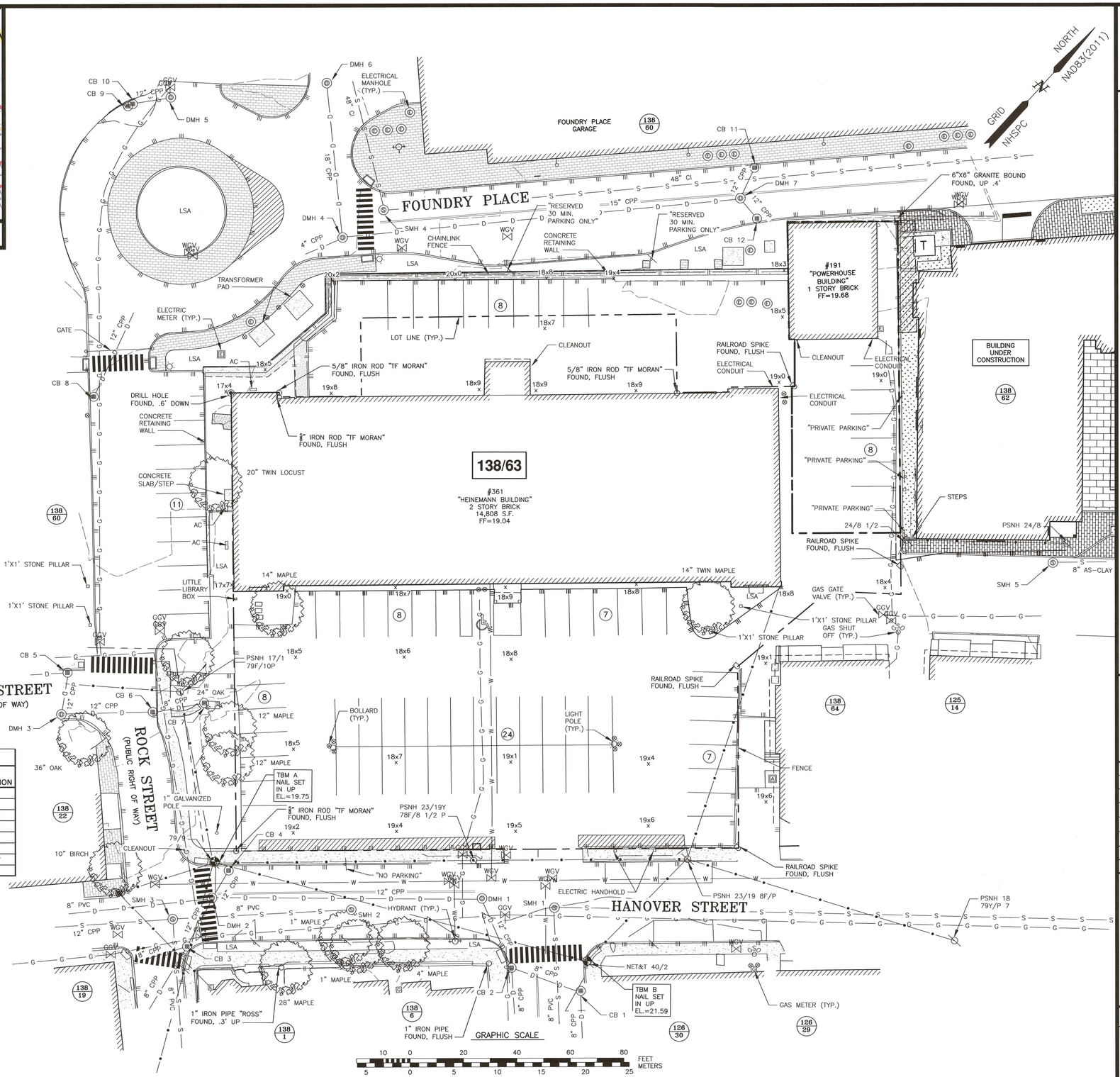
SEWER STRUCTURE TABLE

STRUCTURE	PROP/EX	RIM	PIPE SIZE/TYPE	INVERT IN	INVERT OUT	DIRECTION
SMH 1	EX	20.06	15" PVC		14.36	NE
			8" PVC	14.41		SE
SMH 2	EX	19.31	8" PVC		12.91	SW
SMH 3	EX	19.15	8" PVC		11.45	SW
			8" PVC	11.60		NE
			8" PVC	13.90		SE
SMH 4	EX	12.23	48" CI	-0.77		NW
			48" CI		-0.77	NE



"I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN ACCURACY OF THE CLOSED TRAVERSE THAT EXCEEDS THE PRECISION OF 1:15,000."

JOHN R. CHAGNON, LLS — DATE 4.3.24



HALEYWARD
ENGINEERING | ENVIRONMENTAL | SURVEYING
200 Griffin Rd. Unit 14
Portsmouth, New Hampshire 03801
603.430.9282
WWW.HALEYWARD.COM

NOTES:

1. PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSOR'S MAP 138 AS LOT 63.
2. OWNER OF RECORD:
   361 HANOVER STEAM FACTORY, LLC
   41 INDUSTRIAL DRIVE UNIT 20
   EXETER, N.H. 03833
   6352/2959
3. PARCEL IS NOT IN A FLOOD HAZARD ZONE AS SHOWN ON FIRM PANEL 33015C0259F. JANUARY 29 2021.

EXISTING LOT AREA:
38,528 S.F.

4. PARCEL IS LOCATED IN CHARACTER DISTRICT 5 (CD5), NORTH END INCENTIVE OVERLAY DISTRICT, AND DOWNTOWN OVERLAY DISTRICT.

DIMENSIONAL REQUIREMENTS:
SEE ZONING ORDINANCE

5. THE PURPOSE OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS ON PORTSMOUTH ASSESSOR'S MAP 138 AS LOT 63, AS AMENDED.
6. VERTICAL DATUM IS NAVD88. BASIS OF VERTICAL DATUM IS REDUNDANT RTN GNSS OBSERVATIONS.

SITE REDEVELOPMENT
361 HANOVER STREET
PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
2	ISSUED FOR REVIEW	4/3/24
1	UPDATE E.C. & ADD SPOT GRADES	2/28/24
0	ISSUED FOR COMMENT	1/31/24

REVISIONS

SCALE: 1"=20' JANUARY 2024

EXISTING CONDITIONS PLAN

C1

FB 444 & PG 1

5010135.2977.01

DEMOLITION NOTES

A) THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR THE DESIGNER. IT IS THE CONTRACTORS' RESPONSIBILITY TO LOCATE UTILITIES AND ANTICIPATE CONFLICTS. CONTRACTOR SHALL REPAIR EXISTING UTILITIES DAMAGED BY THEIR WORK AND RELOCATE EXISTING UTILITIES THAT ARE REQUIRED TO BE RELOCATED PRIOR TO COMMENCING ANY WORK IN THE IMPACTED AREA OF THE PROJECT.

B) ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTORS UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES AND CODES. THE CONTRACTOR SHALL COORDINATE REMOVAL, RELOCATION, DISPOSAL, OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.

C) ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/ DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO THE ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

D) THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES AND CALL DIG SAFE AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITIES.

E) SAWCUT AND REMOVE PAVEMENT ONE FOOT OFF PROPOSED EDGE OF PAVEMENT TRENCH IN AREAS WHERE PAVEMENT IS TO BE REMOVED.

F) IT IS THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE CONDITIONS OF ALL THE PERMIT APPROVALS.

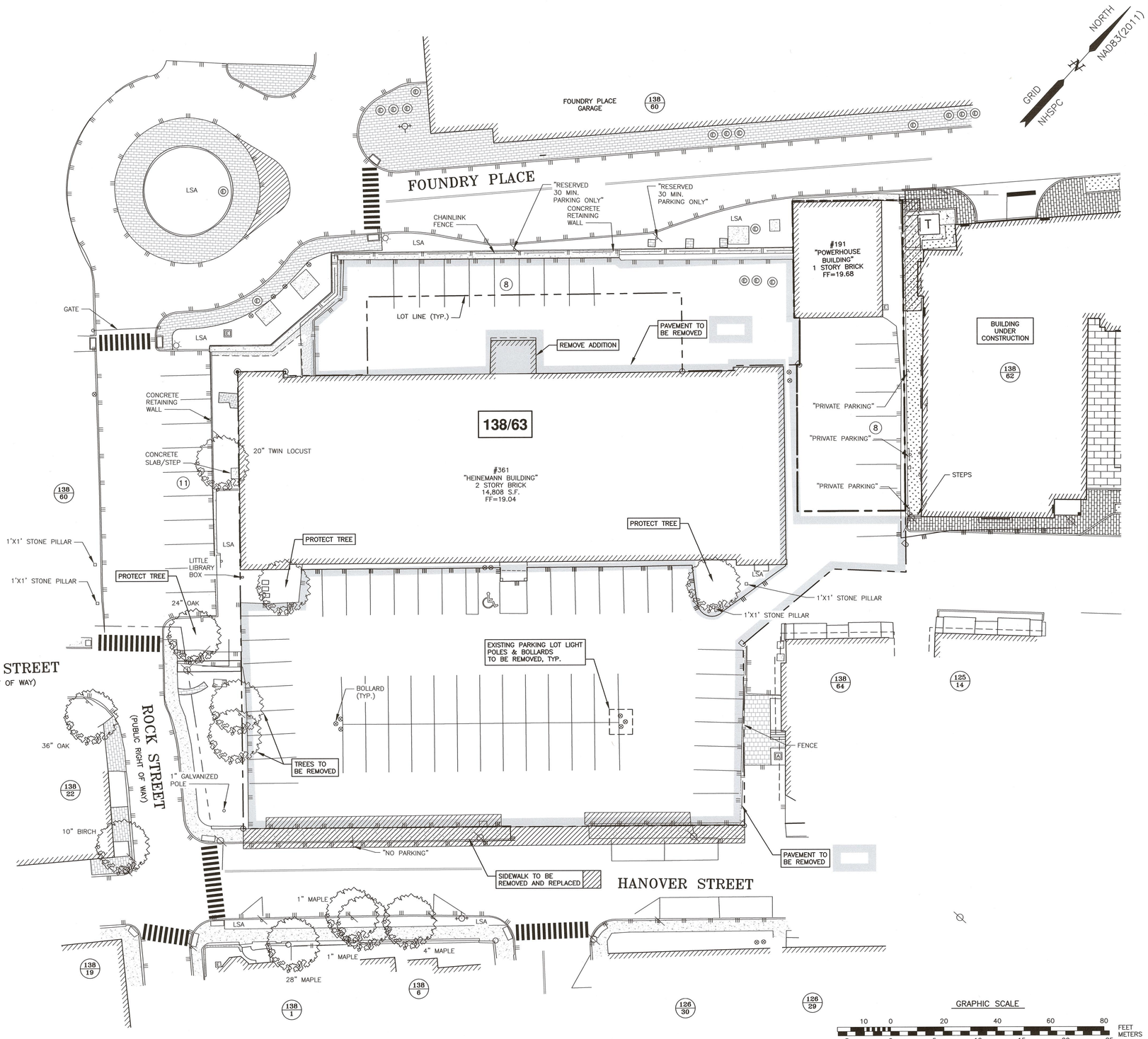
G) THE CONTRACTOR SHALL OBTAIN AND PAY FOR ADDITIONAL CONSTRUCTION PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK AND ARRANGE FOR AND PAY FOR ANY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY ADDITIONAL AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK.

H) THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, CONCRETE, UTILITIES, VEGETATION, PAVEMENT, AND CONTAMINATED SOIL WITHIN THE WORK LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ANY EXISTING DOMESTIC / IRRIGATION SERVICE WELLS IN THE PROJECT AREA IDENTIFIED DURING THE CONSTRUCTION AND NOT CALLED OUT ON THE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER FOR PROPER CAPPING / RE-USE.

I) PROVIDE INLET PROTECTION BARRIERS AT ALL CATCH BASINS WITHIN CONSTRUCTION LIMITS AND MAINTAIN FOR THE DURATION OF THE PROJECT. INLET PROTECTION BARRIERS SHALL BE HIGH FLOW SILT SACK BY ACF ENVIRONMENTAL OR APPROVED EQUAL. INSPECT BARRIERS WEEKLY AND AFTER EACH RAIN OF 0.25 INCHES OR GREATER. CONTRACTOR SHALL COMPLETE A MAINTENANCE INSPECTION REPORT AFTER EACH INSPECTION. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT OR MORE OFTEN IF WARRANTED OR FABRIC BECOMES CLOGGED. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY CLEARING OR DEMOLITION ACTIVITIES.

J) THE CONTRACTOR SHALL PAY ALL COSTS NECESSARY FOR TEMPORARY PARTITIONING, BARRICADING, FENCING, SECURITY AND SAFELY DEVICES REQUIRED FOR THE MAINTENANCE OF A CLEAN AND SAFE CONSTRUCTION SITE.

K) ANY CONTAMINATED MATERIAL REMOVED DURING THE COURSE OF THE WORK WILL REQUIRE HANDLING IN ACCORDANCE WITH NHDES REGULATIONS. CONTRACTOR SHALL HAVE A HEALTH AND SAFETY PLAN IN PLACE, AND COMPLY WITH ALL APPLICABLE PERMITS, APPROVALS, AUTHORIZATIONS, AND REGULATIONS



HALEYWARD
ENGINEERING | ENVIRONMENTAL | SURVEYING
200 Griffin Rd, Unit 14
Portsmouth, New Hampshire 03801
603.430.9282
WWW.HALEYWARD.COM

NOTES:

1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.

2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.

3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION. (NHDES DECEMBER 2008).

4) COORDINATE ACCESS IN STREET/ROW AREAS ADJACENT TO DEMOLITION TO INSURE SAFE PASSAGE. UTILIZE DETOURS IF NEEDED.

5) EXISTING UTILITIES TO BE ABANDONED SHALL BE REMOVED TO THE UTILITY MAIN AND CAPPED PER THE UTILITY COMPANY REQUIREMENT.

SITE REDEVELOPMENT
361 HANOVER STREET
PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
1	UPDATE	7/3/24
0	ISSUED FOR COMMENT	4/3/24

REVISIONS

STATE OF NEW HAMPSHIRE JOHN A. CHAGNON No. 7851 LICENSED PROFESSIONAL ENGINEER

SCALE: 1"=20' JANUARY 2024

DEMOLITION PLAN

C2

FB 444 & PG 1

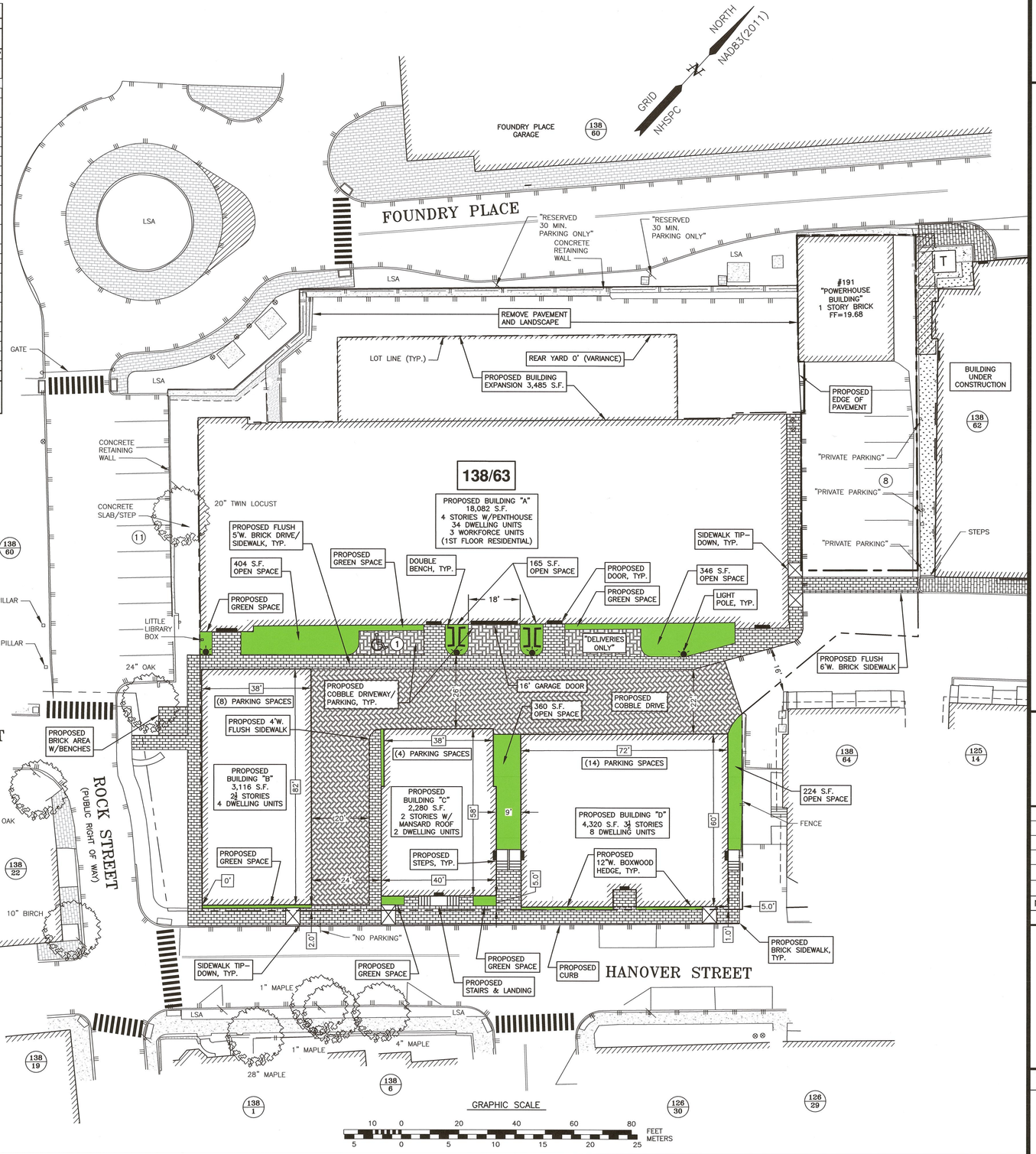
5010135.2977.01

ZONING DEVELOPMENT STANDARD - CUP PLAN

CD5: CHARACTER DISTRICT 5, DOD: DOWNTOWN OVERLAY DISTRICT

	REQUIRED	EXISTING	PROPOSED - Building A	PROPOSED - Building B	PROPOSED - Building C	PROPOSED - Building D
Height	2-3 stories 40'	2 Stories/ 18' +/-	4 stories w/ penthouse 52'	3 stories / 36'	3 stories / 36'	3 1/2 stories / 40'
Penthouses	may exceed bldg height by 2'	N/A	Yes (75% Habitable Space / 8' Setback)	N/A	N/A	N/A
Roof appurtenance	may exceed bldg height by 10'	<10'	<10'	No	No	<10'
Façade Types		N/A	N/A	N/A	N/A	N/A
Building Types	commercial, live-work, mixed use, flex space & community.	Commerical	Apartment	Rowhouse	Duplex	Apartment
Front (principle) max	5	99'	99'	0'	5'	2'
Front (secondary) max	5	0'	0'	2'	N/A	N/A
Side	NR	NR	NR	NR	NR	NR
Rear yard	5'	0'	0'	>5'	>5'	>5'
Front lotline buildout	80% min	100%	100%	80%	80%	80%
Lot area (sf)	NR	N/A	N/A	N/A	N/A	N/A
LOT area per dwelling	NR	N/A	N/A	N/A	N/A	N/A
Building coverage, maximum	95%	38%	47%	8%	6%	11.0%
Maximum building footprint	20,000	14,808	18,082	3,116	2,280	4,320
Ground floor area per use, max	15,000	14,808	<15,000	3,116	2,280	4,320
Open space, minimum	5%	<5%	>5%	>5%	>5%	>5%
Permitted uses		Commercial	Residential	Residential	Residential	Residential
Block length, max (ft)	225	205'	205'	82'	40'	72'
Façade modulation length, max (ft)	100	205	205	82'	40'	72'
Entrance spacing, max (ft)	50	>50'	50	20'	20'	<50'
Floor height above sidewalk, max	36"	0'	0'	24"	24"	24'
Ground story height, min	12'	10'	10'	12'	12'	12'
Second story height, min	10'	10'	10.5'	10.5'	10.5'	10.5'
Glazing, shopfront, min	70%	N/A	N/A	N/A	N/A	N/A
Glazing, other	20%-50%	>20%	>20%	>20%	>20%	>20%
Roof types	flat, gable, hip, gambrel, mansard	Flat	Flat	Hip	Hip	Mansard
Community Space	>10% or 3,852 SF (1,926 SF as pervious)	N/A	4,250 SF +/- (12%)	N/A	N/A	N/A
Wokforce Housing Units	If rental units =10% of total units. 10% of 36 = 3.4 Units = 3 Units)	N/A	3 Workforce Housing Units Floor 1 = 1 Unit Floor 2 = 2 Units	N/A	N/A	N/A

Shaded Boxes = Zoning Relief Required



THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.

ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.

APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN _____ DATE _____

STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR NO. 738 JOHN R. CHAGNON SIGNATURE

HALEYWARD
ENGINEERING | ENVIRONMENTAL | SURVEYING
200 Griffin Rd. Unit 14
Portsmouth, New Hampshire 03801
603.430.9282
WWW.HALEYWARD.COM

NOTES:

1. PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSOR'S MAP 138 AS LOT 63.
2. APPLICANT:
   361 HANOVER STEAM FACTORY, LLC
   41 INDUSTRIAL DRIVE UNIT 20
   EXETER, N.H. 03833
3. PARCEL IS NOT IN A FLOOD HAZARD ZONE AS SHOWN ON FIRM PANEL 33015C0259F. JANUARY 29 2021.

PROPOSED LOT AREAS:
LOT 138/63
38,528 S.F.±
0.8845 AC

LOT 138/63-1
4,717 S.F.
0.1083 AC

4. PARCEL IS LOCATED IN CHARACTER DISTRICT 5 (CD5), NORTH END INCENTIVE OVERLAY, AND DOWNTOWN OVERLAY DISTRICT.

DIMENSIONAL REQUIREMENTS:
*SEE PORTSMOUTH ZONING ORDINANCE AND TABLE.

MINIMUM LOT AREA: NR
SETBACKS:
FRONT: 5 FEET (MAXIMUM)
SIDE: NR
REAR: 5 FEET
MAXIMUM BUILDING COVERAGE: 95%
MINIMUM OPEN SPACE: 5%

5. THE PURPOSE OF THIS PLAN IS TO SHOW THE PROPOSED SITE DEVELOPMENT ON ASSESSOR'S MAP 138 LOT 63.
6. VERTICAL DATUM IS NAVD88. BASIS OF VERTICAL DATUM IS REDUNDANT RTN GNSS OBSERVATIONS.
7. PROPOSED USE: 48 RESIDENTIAL DWELLING UNITS

SITE REDEVELOPMENT 361 HANOVER STREET PORTSMOUTH, N.H.

NO.	DESCRIPTION	DATE
1	REVISED LAYOUT	7/3/24
0	ISSUED FOR COMMENT	6/12/24

REVISIONS

STATE OF NEW HAMPSHIRE JOHN R. CHAGNON No. 7851 LICENSED PROFESSIONAL ENGINEER

SCALE: 1"=20' JANUARY 2024

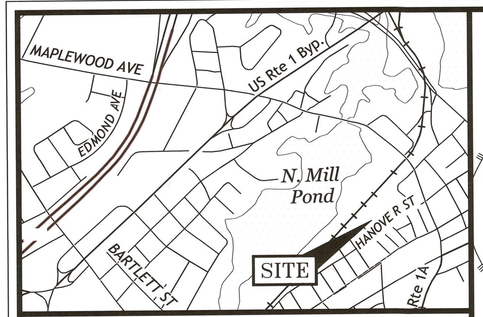
SITE PLAN

C3

FB 444 & PG 1

5010135.2977.01

P:\NH\5010135-Hampshire_Development\2977.01-Hanover St, Portsmouth-JRC\IN 2977\2024 Site Plan\Plans & Specs\Site\2977.01 Site Option B.dwg, 7/3/2024 7:51:44 AM, Portsmouth Plotter Canon TX3000.pc3



LOCATION MAP SCALE: 1" = 1000'

PLAN REFERENCES:

1) "PLAN OF LAND IN PORTSMOUTH, N.H. PORTSMOUTH MFG & POWER CO. TO FRANKIE BROOKS" BY JOHN W. DURGIN. DA TED FEBRUARY 191B. RCRD PLAN 078.

2) "SUBDIVISION OF LAND OF PORTSMOUTH MFG. & POWER CO. PORTSMOUTH, N.H." BY JOHN W. DURGIN. DATED NOVEMBER 1925. RCRD PLAN #36B.

3) "LAND IN PORTSMOUTH, N.H. PORTS. MFG. & POWER CO. TO HAROLD S. WOODS" BY JOHN W. DURGIN. DATED NOVEMBER 1926. RCRD PLAN #389.

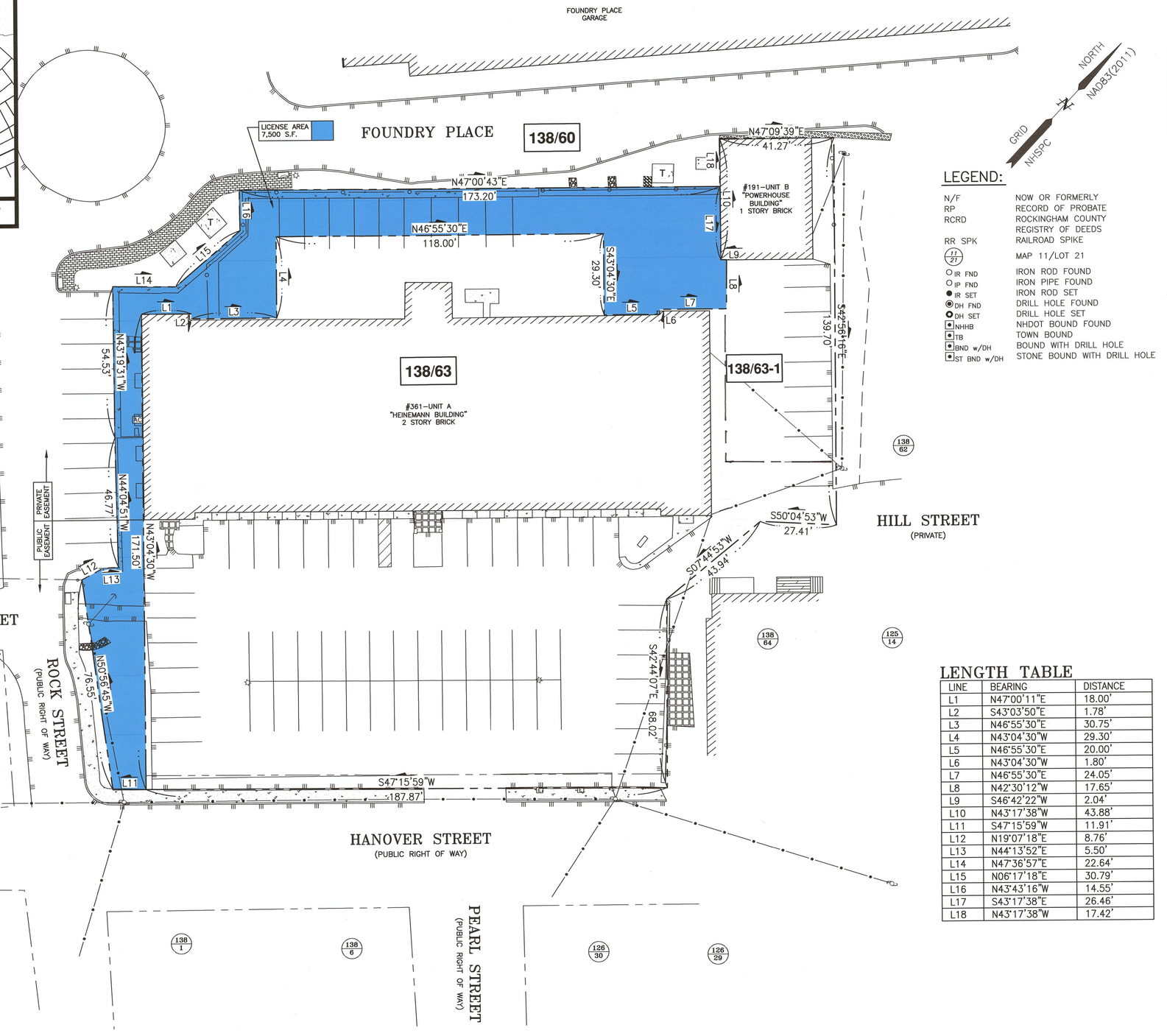
4) "CONDOMINIUM SITE PLAN FOR HANOVER PLACE CONDOMINIUM 349 HANOVER STREET COUNTY OF ROCKINGHAM PORTSMOUTH, NH" BY MILLETTE, SPRAGUE & COLWELL, INC. DATED SEPTEMBER 28, 2004 LAST REVISED DECEMBER 20, 2005. RCRD PLAN D-33379.

5) "CONSOLIDATION & SUBDIVISION PLAN TAX MAP 125, LOT 17 & TAX MAP 138, LOT 62 DEER STREET ASSOCIATES BRIDGE, DEER & HILL STREETS CITY OF PORTSMOUTH COUNTY OF ROCKINGHAM STA TE OF NEW HAMPSHIRE" BY AMBIT ENGINEERING, INC. DA TED JULY 2015. RCRD PLAN D-39699.

6) "KEARSARGE MILLS CONDOMINIUM PLANS" BY KIMBALL CHASE COMPANY, INC. DATED APRIL 15, 1986. RCRD PLAN D-14855.

7) "BOUNDARY LINE AGREEMENT PLAN KEARSARGE MILL CONDOMINIUMS PORTSMOUTH, N.H." BY JONES & BEACH ENGINEERS, INC. DATED APRIL 10, 1997 LAST REVISED APRIL 21, 1997. RCRD PLAN D-25421.

8) "AMENDED SITE PLAN, KEARSARGE MILL CONDOMINIUMS, 1 HANOVER STREET PORTSMOUTH, NH" BY KIMBALL CHASE CONSULTING ENGINEERS DATED 04-14-06 AND LAST REVISED 02-16-07. RCRD PLAN D-34716.



LEGEND:

N/F	NOW OR FORMERLY
RP	RECORD OF PROBATE
RCRD	ROCKINGHAM COUNTY REGISTRY OF DEEDS
RR SPK	RAILROAD SPIKE
11/21	MAP 11/LOT 21
IR FND	IRON ROD FOUND
IP FND	IRON PIPE FOUND
IR SET	IRON ROD SET
DH FND	DRILL HOLE FOUND
DH SET	DRILL HOLE SET
NHHB	NHDOT BOUND FOUND
TB	TOWN BOUND
BND w/DH	BOUND WITH DRILL HOLE
ST BND w/DH	STONE BOUND WITH DRILL HOLE

LENGTH TABLE

LINE	BEARING	DISTANCE
L1	N47°00'11"E	18.00'
L2	S43°03'50"E	1.78'
L3	N46°55'30"E	30.75'
L4	N43°04'30"W	29.30'
L5	N46°55'30"E	20.00'
L6	N43°04'30"W	1.80'
L7	N46°55'30"E	24.05'
L8	N42°30'12"W	17.65'
L9	S46°42'22"W	2.04'
L10	N43°17'38"W	43.88'
L11	S47°15'59"W	11.91'
L12	N19°07'18"E	8.76'
L13	N44°13'52"E	5.50'
L14	N47°36'57"E	22.64'
L15	N06°17'18"E	30.79'
L16	N43°43'16"W	14.55'
L17	S43°17'38"E	26.46'
L18	N43°17'38"W	17.42'

"I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN ACCURACY OF THE CLOSED TRAVERSE THAT EXCEEDS THE PRECISION OF 1:15,000."

JOHN R. CHAGNON, LLS — DATE 7.3.24

APPROVED BY THE PORTSMOUTH PLANNING BOARD

CHAIRMAN — DATE

GRAPHIC SCALE

10 0 20 40 60 80 FEET
5 0 5 10 15 20 25 METERS

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.
200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315
WWW.HALEYWARD.COM

NOTES:

1) PARCEL IS SHOWN ON THE CITY OF PORTSMOUTH ASSESSORS MAP 138 AS LOT 60.

2) OWNERS OF RECORD:
LOT 60
CITY OF PORTSMOUTH
JUNKINS AVENUE
PORTSMOUTH, NH 03801

LOT 63 – UNIT A
361 HANOVER STEAM FACTORY, LLC
41 INDUSTRIAL DRIVE UNIT 20
EXETER, N.H. 03833
6352/2959

3) PARCEL IS NOT IN A SPECIAL FLOOD HAZARD AREA AS SHOWN ON FIRM PANEL 33015C0259F. EFFECTIVE JANUARY 29, 2021.

4) LOT AREA: 38,528 S.F.

5) PARCEL IS LOCATED IN CHARACTER DISTRICT 5 (CD5) AND DOWNTOWN OVERLAY DISTRICT.

6) THE PURPOSE OF THIS PLAN IS TO SHOW A PROPOSED LICENSE AREA ON TAX MAP 138, LOT 60 TO BENEFIT TAX MAP 138, LOT 63 IN PORTSMOUTH, NH.

7) THE LICENSE AGREEMENT BETWEEN THE CITY OF PORTSMOUTH AND 361 HANOVER STEAM FACTORY, LLC WILL REPLACE THE EXISTING PARKING LICENSE AGREEMENT RECORDED AT DEED BOOK 4735 PAGE 2971 AND PROVIDE A PUBLIC AND PRIVATE LANDSCAPING EASEMENT TO 361 HANOVER STEAM FACTORY, LLC.

NO.	DESCRIPTION	DATE
1	REPLOT	7/3/24
0	ISSUED FOR COMMENT	3/21/24

REVISIONS

PROPOSED LICENSE AREA PLAN
TAX MAP 138 – LOT 63
CITY OF PORTSMOUTH
TO
361 HANOVER STEAM FACTORY, LLC

FOUNDRY PLACE & ROCK STREET
CITY OF PORTSMOUTH
COUNTY OF ROCKINGHAM
STATE OF NEW HAMPSHIRE

SCALE: 1"=20' DECEMBER 2022

FB 444 PG 1 — 5010135.2977.01

P:\NH\5010135-Hampshire_Development\2977.01-Hanover St, Portsmouth-3RC\N 2977\2022 Site Plan\Plans & Specs\Site\2977.01 Conveyance.dwg, 7/2/2024 9:40:53 AM, \\SVRPSM-FS01\Portsmouth Plotter Canon TX3000